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**WHO ARE WE?**

**SIGCAS Computers and Society** is the ACM Special Interest Group that addresses the social and ethical consequences of widespread computer usage.

SIGCAS’ main goals are to raise awareness about the impact that technology has on society, and to support and advance the efforts of those who are involved in this important work.

Our members are computer professionals from both industry and academia, as well as ethicists, psychologists, sociologists and others. We welcome students from a variety of disciplines. Our areas of involvement include computer ethics, universal access to computer technology, security, privacy, and reliability. We collaborate with other ACM bodies that are engaged in related work, such as COPE, USACM, SIGITE and SIGCSE.

The ACM Computers & Society is an online publication accessible via the ACM Digital Library. The newsletter aims to be an effective communication vehicle between the members of the group.

**Participation.** Readers and writers are invited to join and participate actively in this Special Interest Group.

Membership is open to all, for US$25 per year, and to students for US$10 per year. The link to join up can be found on our web site, at http://www.sigcas.org

**Contribute.** The editor invites contributions of all types of written material (such as articles, working papers, news, interviews, reports, book reviews, bibliographies of relevant literature and letters) on all aspects of computing that have a bearing on society and culture.

Please note that it is NOT a peer-reviewed publication. Submissions are checked for relevance, accessibility and basic suitability by the editors but not fully peer reviewed.

For the latest Call(s) for Papers, or instructions regarding formatting guidelines and copyright policy please see the website: http://www.sigcas.org/. Submissions may be sent to editors_sigcas@acm.org.

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INTRODUCING THE SIGCAS EXECUTIVE COMMITTEE

Doug Schuler - SIGCAS Chair.
I have been working in the field of computers and society for over 35 years, as an educator, researcher, developer, author, speaker, and organizer. I have written numerous articles, books, and chapters on this topic, which I won’t list here. I worked with the practical side with others to establish the Seattle Community Network in the late 80’s and I’ve had the good fortune to discuss these topics with colleagues from around the world. I’m now retired from teaching at the Evergreen State College, developing CSCW software at Boeing, and campaigning with Computer Professionals for Social Responsibility.

My plan now is to keep active for the foreseeable future to help keep the opportunities and challenges presented by computing visible and to help focus our energy appropriately. In my exploration of civic intelligence, the collective capacity to address significant issues effectively and equitably, I continually asked the question, “Will we be smart enough, soon enough?” which should resonate with this community.

Lisa Kaczmarczyk - Vice Chair.
As Computing for Social Good has been a personal and professional passion my entire career I am very pleased to be the incoming SIGCAS Vice-Chair. I am a strong proponent of collaborative and transparent process and decision making, and as such am looking forward to working with my Board Colleagues as well as with the greater SIGCAS community to prioritize our goals and then act upon them. It isn’t about me, it is about us. What can we do to increase the relevance and usefulness of SIGCAS to the membership and society as a whole? I look forward to learning more from the SIGCAS community about how they would answer that question and working with my Board colleagues to respond.

Alison Clear - Member-at-large.
I am very pleased to introduce myself. I am an Associate Professor, at the Auckland campus of the Eastern Institute of Technology. I have an extensive academic and professional career that has involved academic leadership in research, scholarship, teaching and curriculum development and publications nationally and internationally. Many years ago I developed a new course "The Impact of Computing on Society" and it has been offered every year for the past 20 years and is still proving to be one of the most popular courses on our campus. My research interests include Computing Curriculum development, Gender equity in Computing, ICT in developing countries, and the development of computing education. I look forward to working with the SIGCAS community to further the increasingly important work as computing becomes more pervasive and significant in society.

Mikey Goldweber Past Chair.
Hello again to the SIGCAS community. As past SIGCAS Chair, I hope many of you are aware of my passion and commitment to Computing for the Social Good. I left a high paying industry job in the mid-1980’s (with the Porsche 911 to prove it) to seek a more personally rewarding career path. I landed in education after earning my PhD. However, I felt that being an educator was not quite enough; I needed to help my students see how computing can and should be used to improve society. Working in this area has taken me many places and afforded me the privilege of meeting many amazing colleagues doing amazing things. It also led me to SIGCAS, and after years of being a member, I stepped up into a leadership position. As the Past-Chair member of the Board I hope to continue offering my insights and time as our SIG moves forward to the challenges of the day.

Richard Blumenthal Editor-in-Chief.
Greetings to the SIGCAS Community. Like Mikey, I also left a lucrative job in industry two decades ago to focus on using my computing knowledge to more directly benefit society. Just the same, I am a relative new comer to SIGCAS. My responsibilities include overseeing the production of SIGCAS Computers and Society. I am a Professor and Chair of the Computer and Cyber Sciences Department at Regis University, in Denver Colorado. At Regis, I also contribute to our “Center for Common Good Computing”. Recently, I’ve taken an active role in “Computing for the Social Good in Education”. I have a B.S., M.S., and Ph.D. in Computer Science from Lock Haven State, Rutgers University, and the University of Colorado, Boulder, respectively. I am very excited to be working with the new Board and look forward to helping make this the best ACM SIG.
SIGNCS

MEMBERSHIP BENEFITS

Subscription to the online publication ACM SIGCAS Computers and Society, which is published three to four times a year.

Members have access to the full archive of the online publication and its printed predecessor in the ACM DL. Please see www.sigcas.org.

Discounted registration fee for SIGCAS sponsored conferences and workshops. “In cooperation” sponsor of several ACM and non-ACM conferences related to SIGCAS’ interests, including LIMITS.

SIGCAS presents two awards each year: The Making a Difference Award and the SIGCAS Outstanding Service award.

SIGCAS-ANNOUNCE mailing list: includes regular announcements of upcoming conferences and calls for participation. SIGCAS-Talk mailing list to enable member-member interactions and the committee will seek to stimulate discussion on this list amongst members. Subscription to the list is restricted to SIGCAS members and is optional for them.

NEWS

UPCOMING CONFERENCES

2021

The 10th International Conference on Smart Cities and Green ICT Systems (SMARTGREENS 2021)
The purpose of the 10th International Conference on Smart Cities and Green ICT Systems (SMARTGREENS) is to bring together researchers, designers, developers and practitioners interested in the advances and applications in the field of Smart Cities, Green Information and Communication Technologies, Sustainability, Energy Aware Systems and Technologies.

Conference on AI, Ethics, and Society (AIES ’21)
AIES is convened each year by program co-chairs from Computer Science, Law and Policy, the Social Sciences, and Philosophy. Our goal is to encourage talented scholars in these and related fields to submit their best work related to the morality, law, and political economy of data and AI.

The 10th International Conference on Communities & Technologies (C&T 2021)
The focus will be on “Wicked Problems in the Age of Tech” and welcomes participation from all sectors for whom interaction between community and technology is important. See website for information on papers, workshops, demos, and community day.

The 7th International Conference on Smart Objects and Technologies for Social Good (GoodTechs 2021)
September 15-17, 2021 — Aveiro, Portugal— https://goodtechs.eai-conferences.org/2021/
Dedicated to computer science and engineering researchers working with the design, implementation, deployment, operation, and evaluation of smart objects and technologies for the social good.

Computer Supported Cooperative Work and Social Computing (CSCW’21)
October 23-27, 2021 — Virtual Event, Canada — https://cscw.acm.org/2021/
CSCW is the premier venue for research in the design and use of technologies that affect groups, organizations, communities, and networks. CSCW explores the technical, social, material, and theoretical challenges of designing technology to support collaborative work and life activities.

The 23rd International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS ’21)
The ASSETS conference is the premier forum for presenting research on the design, evaluation, use, and education related to computing for people with disabilities and older adults.
Welcome to the first issue of ACM SIGCAS Computers and Society for 2021. In case you have noticed, our SIG is now fifty years old. Many of the previous issues of Computers and Society are available in the ACM Digital Library. In fact, if you have any of the missing issues, let us know so that we can get them into the library and online.

From time to time, I get asked by interested parties how they can contribute? In my role as the Editor-in-Chief of Computers and Society, the answer is to submit articles for publication or, better yet, submit an idea for a regular column. I believe Computers and Society should be the premier computing publication in which society discusses the relation between computers and society. Towards this end, we routinely accept appropriate position pieces designed to initiate further discussion among our members. As examples, consider the author’s “call to action” found in the various pieces appearing in the remainder of this issue.

Speaking of a call for further discussion, this issue begins with Douglas Schuler presenting the results of the member survey conducted by the Executive Board in 2020. In his role as the Chair, he provides insightful commentary on these results and provides his interpretive perspective of the data and how we might act on it, as a vehicle to invite further conversation among our membership.

In her Thinking Like a Lawyer column, Johanna Blumenthal uses the “location” of the Internet to motivate her call-to-action. As I’m trying to tease the reader and not provide spoilers, you’ll have to read her piece and question of legal rules and the Internet. As her column intends, the perspective of a lawyer asking where is the Internet located is vastly different than that of a technical perspective in which things like data latency between hosts and the availability of inexpensive electricity for server farms are issues of consideration.

Naturally, I have the privilege of reading the articles published in Computers and Society before the general membership and I must admit that I’ve already borrowed from Michelle Trim’s column and have told several people that post-Covid, I don’t want to return to normal (thanks Michelle). Instead, we need to follow Michelle’s continued call-to-action and question whether we are really sincere in our desires to want CS for all, technologies to be fair, and people of color and women to join our departments and our engineering teams and our leadership circles? As always, a read of Dr. Trim’s column is time well spent.

Saud Almualla continues the call for further discussion in her Short Piece contribution, which derives from considerations she poses to her students regarding the nature of our relation with technology.

Sheila Martins presents an ethnographic study, focusing on the human factor impacts, by analyzing the relation of the pedagogical strategy requirements implemented into regular programming classes with the efficacy of the classroom changes proposed to improve teaching practice and study behavior. This in-depth article demonstrates the breadth and depth of Computers and Society since efforts to improve the teaching computing related concepts certainly impacts society.

Finally, my parting opinion was initially inspired by a quote from an article in the first publicly available Computers and Society issue, 1, (2) over fifty years ago. In this opinion, I offer several false dichotomies related to computing and society. In addition to inviting further discussion, my call-to-action asks for help in exposing these false dichotomies, which I believe will contribute to Computing for the Social good, both in general and as part of CSG-Ed (i.e. in education).
Part of the Executive team’s responsibility is to encourage more voices and varied perspectives on topics relevant to computers and society. Consequently, we at the “SIGCAS Publications Group” are seeking short pieces that are relevant, provocative, diverse, and unexpected for our issues of *Computers and Society*. We also hope they will be fun to write.

The possibilities, effects, implications, opportunities, challenges, myths, realities, and struggles related to computers and society that are being played out every day in millions of different ways are helping to determine who we are and where we are going. We want to capture at least some of that.

Your short piece could raise arguments, issues, critical questions, resource needs, current work, research, reviews, discussions, etc. etc. To that end we have developed a robust infrastructure of departments, divisions, bureaus, and other descriptive categories to help convey to you all that this is a vast, very formal and bureaucratized enterprise.

While some of the names may be fanciful we are optimistic that the articles they help characterize will be compelling, relevant, and influential.

We plan to experiment with this approach. We are currently planning to run several short pieces per issue. And we will probably add new departments at will. We also plan to be flexible but we do insist that these articles be short. (After all the SIGCAS Newsletter will still run longer pieces!) Shall we say 1,200 words max?

To be considered for the next newsletter please submit your short piece to the SIGCAS Newsletter Editor, Rick Blumenthal, editors_sigcas@acm.org, by March 1, 2021 (the subsequent issue deadline will be in May, 2021). Please include “Short Piece” in the subject line.

**COMPUTERS AND SOCIETY AREAS OF INTEREST**

- News From _____ (community, company, department, movement, country, sector, dimension, rain forest, or what-have-you)
- Your Resolution or Manifesto Goes Here
- Not All is Wrong Department
- Systemic Racism & Black Lives Matter Studies and Reports
- Teaching about Computers and Society
- Social Responsibility in Computing Department
- Department of Development Studies
- Ominous Development Department
- What Could Possibly Go Wrong? Department
- Office of Emerging Technological Directions
- Voices of Practitioners and Younger Professionals
- Department of Diversity and Inclusion
- Climate, Biodiversity, and the Environment Department
- History Department (of SIGCAS and Computers and Society)
- Thrilling Adventures in Computing
- Looking at SIGCAS: Useful, Enlightening, Maddening or Other Influential Fiction, Poetry, Art, and Movies Related to Computing and Society Division
- Department of Technology Assessment
- War and Peace Studies Hall
- Help me work on myProject.dept
- Science Lab
- Religion and Spirituality Division
- Gender Notes
- Underscrutinzed Implications Bureau
- Office of Expected and Unexpected Consequences
- What Should We Do Room
- Methods: How to do Computers and Society Group
- Annals of Agnotology
- Algorithms: Good, Bad, and Ugly
- What’s a Professional Organization To Do Department
- Automating Evil: Office of Worst Practices
- Chronicles of Civic & Community Tech
- Department of Civic and Collective Intelligence
- Office of Technology Assessment
- Critics Corner (interviews, etc.)
- City Desk / Urban Studies
- Town and Country Consulate
- Point / Counterpoint Forum
- SIGCAS Agenda Development Department
- SIGCAS and Wicked Problems
- On the Job Department: SIGCAS and Employment
- SIGCAS and the Green New Deal
- Personal Perspective Department.
- You Can’t Make This Up Department
- Design Perspectives and Perspectives on Design
- Student Voices Division
- Activism Sector
- Patterns of Computing Department
- Limits and Collapse Ministry
- Recent Reviews (books, articles, etc.)
- Steering Tech Department (policy and all the rest)
- Directions and Implications of Advanced Computing
- No Comment Department
- For or From The Archives
- Data and Datafication Office
FROM THE CHAIR

THINKING ABOUT THE 2020 SIGCAS MEMBERSHIP SURVEY

BY DOUGLAS SCHULER

Keywords: SIGCAS Membership Survey  
Categories: Social and professional topics → User Characteristics

Last November (2020) the SIGCAS executive board conducted a survey of SIGCAS members to get a picture of who we are, where we come from, what we’re interested in, and what the membership would like to see the board do to better fulfill its mission. Based on discussions with the executive board, SIGCAS Vice Chair Lisa Kaczmarczyk implemented the survey using Survey Monkey. As with all surveys one can’t get all the information one would like and the more information one tries to obtain, the fewer people are likely to supply it. We settled on eight questions and we received input from 68 people, about 23% of our membership (then just under 300 people—now slightly over).

What follows is a presentation of the survey results along with some commentary. How I interpret the data and what I think ought to (or could) be done with the data might not be how you’d interpret the data and think about what ought to be done. And that’s a good discussion to have! At any rate, the responses that we’ve received represent a valuable part of our collective intelligence, consciousness, and visions for the future. The hope is that these will inform our work going forward.

Please note that I’m not doing any professional analysis since I’m not qualified to do that. I also suspect that the wisdom we can glean wouldn’t be found via additional number crunching. And I would also add that there are dangers to reading too much into survey data. As a precaution I have asked the other board members to take a look at this article so I don’t get anything terribly wrong.

Just a reminder that the data we have doesn’t necessarily reflect the totality of what our entire membership would provide. (Although, as one somewhat validating figure, the percentage of people outside of North America on our roster is about the same as the percentage of people who told us they were from outside North America on the survey, 72%.) Also, I’m trying to avoid the temptation to comment on everything. There’s too much material for that. And, obviously, there are too many suggestions and ideas out there for SIGCAS to move on all of them. But based on these responses a multitude of useful information is now available and it should help lead us into productive discussions and actions.

The Survey

The survey seems to divide naturally into two parts. The first part looks at the demographics of our members and is more quantitative while the second looks at their interests and aspirations and is more qualitative and less amenable to straightforward numerical analysis.

The first raises questions about the diversity of our membership which in turn is likely to suggest or reflect inherent biases or tendencies, however unconscious, in relation to how SIGCAS operates, or the ACM or the computing industry as a whole, or other factors. It could suggest, for example, that SIGCAS was less likely to appreciate or take up certain issues or the possibility that we would not engage as effectively as we could because of a lack of knowledge, diverse perspectives or other resources.

The two sides of the survey, demographic and aspirations, are definitely related although it’s not an easy matter (at least for me) to spell this out with any confidence. Generally diversity contributes to the collective intelligence of a group. And a lack of diversity can inhibit a group’s collective intelligence.

Member Demographics

The survey asked where our members live, who they work for, and what gender and ethnic identification that they identify with. These questions start to tell a story of sorts in relation to the relative diversity within SIGCAS.

- What part of the world do you live in?
- What type of organization do you work for?
- What is your gender identification?
- What is your ethnic identification?

The data from these questions tells us about some of our more easily identified characteristics. We can develop many hypotheses from this data. Some of these are more likely to be true than others in general while others may be more contextual. The ethnic identification, for example, seems to imply a US context and the dynamics between North America heavily dominates the numbers and the US heavily outnumbers those from other North American countries. This, to some degree, probably reflects the fact the ACM began and is headquartered in the US. This skewing is profound: looking at our full membership list reveals that all our European members are in Western Europe. The survey results show no members from Central / South America, Africa, or the Middle East while in fact we do have some members from those places, admittedly quite low. The “global south” is severely under-represented in our member and those are the regions that are more likely to be bearing the brunt of global problems such as climate change. In my opinion this is one area, among others, in which we would like to extend our membership, and, hence the voices of people from outside the dominant regions.

EU / Europe: 15%  
Asia: 4%  
Australasia: 3%  
Central / South America: 0%  
North America: 77%  
African Continent: 0%  
Middle East: 0%

(All percentages are estimates and due to rounding may not add to 100%.)

By way of contrast, SIGCAS is significantly less diverse in terms of where its members live than ACM as a whole. About 78% of our members live in North America while slightly over 51% of ACM’s members live in the US. Also Asia is among the least well-represented of SIGCAS members (fewer than 3%), while Asian members account for about 27% of ACM’s. (https://www.acm.org/binaries/content/assets/publications/advertising/acm-audience-profile.pdf)
What type of organization do you work for?

The answers to this question reveal that more than half of us are primarily involved in academia and about half of the remaining members are in industry. This high involvement in academia suggests of course that a natural focus of our work could revolve around elements of that work: research, teaching, writing, and working with students. (And here I'm presuming that this is primarily higher-ed, revealing the divide between post-secondary level education and the education of youth.)

Academia: 53%
Industry: 24%
Self-employed: 6%
[tied] government: 5%
[tied] retired: 5%
Other: 6%
Non-profit: 0%

(All percentages are estimates and due to rounding may not add to 100%.)

One question among many that we could ask is why the number is so low for non-profits?

One question among many that we could ask is why the number is so low for non-profits. It might be the case that SIGCAS members are volunteering for a number of causes that could be broadly labeled as civic, non-for-profit, or advocacy that don’t pay the bills but nevertheless receive considerable attention. The question of volunteering was one of the questions that we omitted due to our desire to keep the survey brief. And of course we could follow up later.

What is your gender identification?

As with the other categories our membership skews towards the privileged groups: Over 2/3 of our members identify as male and one of our priorities should be adding more people who identify as something other than male because of this over-representation in our ranks.

male: nearly 70%
female: slightly over 20%
Prefer not to answer/other: slightly under 10%

(All percentages are estimates and due to rounding may not add to 100%.)

What is your ethnic identification?

The results from the ethnic identification question were interesting Here the survey allowed people to describe their ethnic identification in whatever way they felt was appropriate. The results seem interesting and important but there are various limits to exactly what we can draw. Multiple people, for example, could use the same term for answering the question but not necessarily meaning it in the same way. It also works the other way around: People use different terms for the same thing. For example, in my tabulation it appears that ten different terms were used for what I’d call "White" or "Caucasian." There were also respondents who used a specific country of origin for their ethnicity and this could be interpreted as "White" in many cases but is by no means certain.

Forty of our respondents (77%) provided answers suggesting that they were White or Caucasian and another 5 (9%) supplied ethnic identifications based on countries in Western Europe and one person indicated Hispanic (2%). Two people (4%) supplied religion-based ethnic identifications and four people indicated mixed ethnicity (8%).

(Note that "mixed" was used explicitly by respondents.) Finally three respondents (6%) explicitly preferred not to indicate their identification or, in one case (2%), supplied an unusable response.

Unfortunately, from the perspective of diversity and representation within SIGCAS, there were no responses that explicitly indicated that the respondent self-identified as Black, African, or African American although it’s possible that one or more respondents could have used one of those terms or others instead of, or in addition to, the terms they did use. As a member of SIGCAS and as a citizen of the United States (also male and white) I feel that this low level of presence of people of color in SIGCAS is very significant and needs to be considered and appropriately addressed in the months ahead, especially given the preponderance of North American members, the relative influence of the computer industry that is US-based, and the current broad-based movement to better understand and move forward on the severe challenges of systemic racism and police violence in the US.

Some thoughts on the Demographics

It seems clear that our ability to address gender issues, ones dealing with race, and ones that are important in non-US, or non-Western contexts is not as well-prepared as it could be. Nor are we necessarily aware of the all the institutional and other factors that are behind our demographic lack of diversity. While in no way is this intended to disparage our membership who have shown their willingness to focus on the social issues involving computers (thank you!) our overall diversity, seen demographically, needs to grow. This is something that the board recognizes and wants to address over the coming months and years.

The issue of race and diversity is of course not solely an American issue. That being said, these issues in the United States are now beginning to move beyond lip service to actual changes in practices. Although the ACM has been working on gender issues for some time the organization in general seems to be slower than other groups and professional organizations (such as AAAS) in coming to terms with issues related to race. Thus as we contemplate diversity in our SIG we must pay special attention to the voices of Black computer professionals who have been articulating the responsibility of the computing field, both in academia and in industry.

Other SIGs and ACM efforts are certainly working on these issues. The "Open Letter & Call to Action to the Computing Community from Black in Computing and Our Allies" from June 8, 2020 offers a wide-range of useful suggestions for changing policy, procedures, and systems, supporting students, and improving industry and academic workforce and research environments. And recently the editors-in-chief of ACM Interactions produced and published a strong Statement of Solidarity (https://interactions.acm.org/statement-of-solidarity), some of which follows:

"In our magazine, as in our individual scholarship and practice, we have too often failed to confront anti-Black violence and systemic, institutionalized racism, remaining silent when we should have spoken loudly. We have an opportunity to follow the courageous lead of millions of activists by demonstrating care and solidarity in the fight against white supremacy within design and computing fields. We can do more to care for our Black colleagues and other persons of color, their well being, and their safety. We can do more to work with our non-Black and white colleagues to remind them and ourselves of the internalized anti-Black racism that runs deep and that we are each responsible for unlearning. We owe it to our community as a whole to do more and to work harder to protect people’s right to live free from racism and injustice.”

Member Interests and Aspirations

Looking at our Member Aspirations in the second category of the survey, it does appear that the concerns of the respondents are diverse and not driven, for example, by the desire for personal gain. Unfortunately this apparent diversity of concerns could be deceptive because some concerns that are important to less well represented groups may not have even been listed in the survey. Nevertheless I feel that these represent genuine concern and that our membership is willing and able to look at issues of computers and society squarely.

With the questions in this category we wanted to try to understand the reasons that members joined SIGCAS and what they thought the board and others within our SIG should do to help fulfill our mission.

• Why did you join SIGCAS?
• What areas of Computers and Society are you most interested in?
• Please rank the following list of priorities for the SIGCAS Board over the next three years
• What else should SIGCAS board focus on?
Why did you join SIGCAS?

Many of the responses suggested that the mission of SIGCAS was one of the, if not the most, important SIGs within the ACM, as to why members joined SIGCAS. One person opined that SIGCAS was the only group within ACM that explicitly focused on computing for the social good. This, obviously, suggests that the SIG should undertake important projects within ACM. Many have had a “long standing personal interest in the effects of technology on society” while others have just become interested due to a class or conversation with a colleague. One statement was a good consolidation of what many had indicated: "to contribute to computing by undertaking research and development of software and hardware that enables data democracy and thereby empowering individuals, particularly those who are most disadvantaged in our societies.” Others are involved in community activism, some are interested in more computer and society issues in CS education. And another salutes the necessity of having a forum in which technology developers participate. Many respondents are or were involved in other relevant organizations, disciplines, and conferences: Computer Professionals for Social Responsibility, Society for the Social Implications of Technology of the IEEE, Computing for Development/Computing For Good/ICTD/DEV, SIGCSE, and other ACM SIGs.

What areas of Computers and Society are you most interested in?

We formulated this question in an attempt to get a broad feel for the types of issues our members are interested in. Although, again, the demands and constraints of the survey approach can’t uncover all of the possible issues related to computerers and society. Nevertheless this rough summary does uncover some useful information about our collective interests. This listing does not preclude us working in other areas but it does suggest that projects such as workshops or white papers could be developed with these themes in mind. It also suggests areas that we could organize the work of our SIG as well as to help identify possible collaborations. The results are shown below tabulated in order of how many respondents ranked them and graphically, in the Figure 1 bar chart, in order of how the possible responses were presented.

Over 50%  
Ethics and Social Responsibility  
Privacy, Surveillance, and Civil Rights  
Education
Over 40%  
Algorithms and AI  
Peace and Social Justice  
Over 30%  
Democracy and Elections  
Environment
Over 20%  
(tie) Health, Policy, and the Law  
(tie) Ethics and Social Responsibility
Over 10%  
Other  
Jobs and Workplace

Not to necessarily attach undue significance to the area of jobs and workplace, but it could be the case that these issues are less likely to be noticed by people in our positions. Virginia Eubanks and many others have noted that poor people are very familiar with some of the more unsavory uses of computers in society because they are often forced into data entry in order to obtain government assistance or as a form of employment. Likewise, firms like Amazon that routinely pay its technical and management employees hundreds of thousands of dollars per year at the same time it fights any attempt at obtaining union representation for its drivers, warehouse employees, etc. In other words, while not disregarding the preferences of our members as shown in the survey results, it’s clear that other issues may still be worthy of our attention.

Please rank the following list of priorities for the SIGCAS Board over the next three years

For this question, the board proposed nine plausible priorities to which we wanted membership input. The results are shown below, both in order that they appeared on the survey (Figure 2) and in order of priority proposed by the respondents. While the priorities can be seen in order of preference, it does seem that (1) the gap between the highest and lowest priority is not great; and (2) probably, more significantly, is that these can (and should) be thought of as potentially mutually enhancing. So, while “community building” was ranked highest, it easy to make the case that this could help increase SIGCAS’s impact and influence. Also, in a point I discuss below, while “Developing and supporting SIGCAS working groups” was rated lower than many it could definitely help “Increasing SIGCAS’s impact and influence” as others such as supporting SIGCAS conferences and meetings.”

Priorities In Ranked Order
- Community building among SIGCAS members
- Increasing SIGCAS’s impact and influence
- SIGCAS conferences and meetings
- Providing online content
- [tie] Broader community outreach
- [tie] SIGCAS sponsored projects
- Developing and supporting SIGCAS working groups
- Expanding SIGCAS membership
- Establishing working partnerships with other SIGs

What else should SIGCAS Board focus on?

42 of the 68 respondents also took time to suggest additional activities that the board could undertake (although person commiserated and suggested that we probably had enough to think about already!). The suggestions fit fairly comfortably into three categories—relationships (or
Looking first at relationships within our own SIG and recognizing that “Community building among SIGCAS members” was ranked first in priorities, we notice that this was concern was reinforced by responses in this section including “Connecting members with one another” and “involving more SIGCAS members in SIGCAS work.” Several survey respondents indicated that they are active with other groups and we should be able to build on these relationships. It was interesting to see how prevalent the view was of collaborating or otherwise engaging with outside groups: Corporations to buy into and support the SIGCAS mission; professional associations to raise awareness, generating inter-SIG collaborations; and working with ACM Councils, USTPC, EUTPC. Many also expressed an interest in working more closely with various groups such as “policymakers and industry executives” or groups “coming at this from the society side.” Several educational approaches were mentioned: “Programs targeted at students; doing more to influence educators to consider positive social impacts CS can have in the future” and “Why shouldn’t we be teaching all school students in kindergarten about ethical behavior in cyberspace?” One theme that appeals to me was the idea of “Increasing participation by ACM members and chapters outside the USA” and to “Foster more global reach with regional ACM chapters to build SIGCAS groups there. Many suggested that SIGCAS needs to have a broader public profile and to “play a larger role in public discussions that are shaping real-world policies (e.g. around surveillance, ML, algorithmic bias).”

Creation
This element includes “being relevant in the real world, and setting a goal that impacts the real world and then achieving it.” Some of the possible goals include: “developing a framework for professional charity work for software developers, computer scientists, data scientists, and IT specialists akin to pro bono work for legal professionals” or, in a similar vein, “providing a multitude of ways that allow regular SIGCAS members to contribute and building a framework to incentivize project ideation and content creation.” Also, as computer professionals the option to actually develop software is actually available. I was particularly intrigued by the idea of “developing teaching resources to teach socio-technical issues, ethics and social impact, following the ASA model” — and maybe even partnering with them. This also relates to ideas in the prior section about extending our educational reach. Other responses include “Expanding the ACM COMPASS conference” and giving “Awards to encourage and recognize best practices in community engagement and best research in addressing SIGCAS priorities” which are both areas in which the board intends to move forward with.

Many of the suggestions sketched broad, overarching directions, such as “having an impact on society” or “moving beyond ethics.” Many were more specific: “Strengthen democratization of and participation in the society with focus of optimizing value creation for all” or “Work with the Pledge of the Computing Professional to make graduates more aware of their responsibilities to society.” Finally, the intriguing idea of “Providing a multitude of ways that allow regular SIGCAS members to contribute and building a framework to incentivize project ideation and content creation.” Finally, also, as computer professionals the option to actually develop software is actually available.

Value
The theme of value came up over and over: SIGCAS should be the “ethical voice” or “conscience” of ACM. Generally speaking this means promoting what we consider positive uses of technology and preventing or otherwise tamping down negative uses: “I think that SIGCAS could call attention to the potentially detrimental effects of computing, and develop / publish a positions on the unnecessary, unwise and even exclusionary uses of computing technology.” The responses also prioritized the idea of not only having a positive impact on society but to establish that as an explicit goal for which our SIG should take some responsibility.

Social Responsibility: What to do with the Findings
The paragraph below from the June 20, 2020 letter from “a cohort of Black academic researchers, scholars, practitioners, designers, and students that are affiliated with ACM” reminds us that all the work we do takes place within social and economic contexts. It is very much about power. Software is developed with certain goals in mind and these goals are not necessarily shared with others, nor are the effects of any negative consequences borne equally. And here we see another crucial point through their example of machine learning: how diversity (or lack thereof) in our SIG and in the computing field more generally and the issues we face are tightly bound together:

We know that our field does not exist in a vacuum. The structural and institutional racism that has brought the nation to this point, is also rooted in our discipline. We see AI and big data being used to target the historically disadvantaged. The technologies we help create to benefit society are also disrupting Black communities through the proliferation of...
racial profiling. We see machine learning systems that routinely identify Black people as animals and criminals. Algorithms we develop are used by others to further intergenerational inequality by systematizing segregation into housing, lending, admissions, and hiring practices.

(The italicization above is mine)

The challenge, as I see it, is what do we need to do to help make SIGCAS more diverse and at the same time help make it more viable as an influential player in the world of computers and society. Armed with a better idea of our interests, goals, and priorities put us in a better position to develop projects and plans—and the committees, teams, or working groups that will carry that work forward. At the same time we are developing and implementing our ideas for increasing our diversity we want to improve our ability to organize ourselves and work towards our goals.

The demographics help us with thinking about the people that we may be able to draw on for actions. Diverse in demographic characteristics or not, these are the people (and I’m one of them!) who constitute our group and, if I may extrapolate, they are people who have expressed the desire to make computing a more positive, humanistic, and sustainable force. I definitely view our membership—positive rather than a membership that is noted by a deficiency of diversity. In other words, the 300 or so of us (out of the nearly 100,000 ACM members) who have selected to join this SIG. Of course there are thousands of ACM members who are concerned about how computing plays out in society but they may not yet be finding ways in which to address their concerns.

The question of starting working groups is an obsession of mind. These could be organization-based but they need to be open, engaging, and active. You can call them committees if you want but some kind of organizational grounding needs to exist. And what would this look like? What sort of support would they need? In addition to helping to get SIGCAS working groups off the ground (or find other existing “working group” organizations to work with) I’m personally ready to get involved in a Social Responsibility Working Group, a Civic Technology working group, a Wicked Problems working group, or a Pattern Languages for Social Change working group. Let me know if you’re interested!

I’m also hoping to contact people from IEEE’s Society for the Social Implications of Technology (SSIT) to discuss collaborative possibilities. One survey response suggested several intriguing possibilities. The organization which “some have called the conscience of IEEE” appears to be a close cousin to SIGCAS. SSIT describes itself as “a community that engages some of the world’s experts on technology and its impact, but also philosophers, lawyers, ethicists, policy makers, professors.” It has five technical activities committees (TACs): (1) Sustainable Development; (2) Ethics/Human Values; (3) Universal Access to Technology; (4) Societal Impacts; (5) Protecting the Planet. These committees seem somewhat analogous to the working groups proposal that I’m hoping will bear fruit for us. It might be a useful exercise for us to identify what themes, if any, along the lines of SSIT’s TACs that we might want to adopt.

Other tasks in the gleam in our eye or in the planning stage are convening an event or two this year, increasing our membership numbers, and building more diversity within our ranks. This includes diversity of location on earth including those with non-Western members as well as gender and ethnic diversity. We’ll need projects and proposals for any and all of these efforts and we’ll need to have volunteer help since none of them come without costs, generally time, a more-or-less precious commodity.

Please feel free to contact me (chair_sigcas@acm.org) with any concerns or thoughts you have on this note. We are also hoping that this information and recommendations will be discussed on our discussion lists. I’d also like to remind everybody that our newsletter, Computers and Society, is always looking for “Short Pieces”, a wide open platform for ideas, reports, and what-have-you related to computers and society.

Thanks for everyone who contributed your thoughts to the survey! And to all of our members as well! This will be the last time you’ll have a chance to contribute. Ideally this will lead into more discussions and more opportunities to engage. As stated in the letter from Black ACM members, “There is a role for each of us to build stronger, more creative, and more inclusive communities.” The landscape of issues regarding computers and society is continually shifting. We now seem to be a bit better prepared for to help with its navigation. What are our next steps?

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Computing for the Social Good in Education
BY CSG-ED TEAM

On March 10, the Computing for the Social Good in Education (CSG-Ed) community met during an a virtual Affiliated Event at SIGCSE’21. This year’s half-day CSG-Ed event used the theme of “A Renewal on Why We Became Educators” as a focal point for reflection on the community’s CSG-Ed efforts including assessing “why computing is perceived as a lucrative career choice, but low on the list of providing a means to improve society; especially among women and underrepresented minorities”.

This year’s event began with a poll focused on “what your institution brags about”. This was followed by a journaling activity in which attendees were asked to consider their legacy and what they will be proud of after they retire. This activity was followed by a small group breakout sessions in which discussed how well they were on track to achieving their legacy. What is working and not working to support your goal? The entire group came back together to share their thoughts and discover any common patterns.

To foster an increased sense of community, the attendees were then reassigned to different small groups to further discuss issues associated with achieving their legacy with respect to CSG-Ed.

The next activity focused on identifying concrete actions that CSG-Ed members can take to help enact change beyond the classroom. (Note: previous CSG-Ed events focused on actions to be taken within the classroom.)

Following the small group discussion and returning to the larger group, an ideation activity followed. This activity focused on selecting an exciting, personal CSG-Ed project to work on and determining what is needed to get started with this idea including the first steps to take after leaving the CSG-Ed event.

As indicated by the approximately 200 people who registered for the event, which was capped at 100, and positive feedback from the Affiliated Event, interest in the CSG-Ed movement remains strong. The CSG-Ed community is hosting a one-hour virtual Drop-In Conversation follow-up event on May 12, 2021. Whether you attended previous events or not, all are invited to drop-in.

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There is always a lot of hype and discussion in the international news when laws are passed by certain countries or a court rules upon a case that was adjudicated in a particular country. As examples, in the United States, there was considerable coverage of the passing of the European Union’s General Data Protection Law in 2016 [1], as well as, coverage of law suits occurring in Europe, such as the European Commission’s actions challenging the tax benefit Ireland gave to Apple [2] and Epic Game’s law suit against Apple and Google in the UK [3]. Outside the U.S., there was considerable coverage of President Trump’s threat to ban TikTok in the United States [4]. The question is why? If these actions are occurring overseas, why is it newsworthy what other countries are doing? If some country limits what can be done within its borders, doesn’t that only affect users in that country or the design of software products for companies who desire to sell their products there? For example, since it’s impermissible to use Netflix in Israel, a screen pops up telling the user that they cannot watch from their location. However, if you have been in Israel, you would know that users simply route through a virtual private network to access Netflix. An average user, this approach feels "shady" and they may choose to not watch Netflix at all. Likewise, many companies have adapted how they present their offerings that are on the Internet to comply with local laws, for example, in China.

To be specific, what happens when a company located in one country violates the laws of another country? The answer to this question is a bit complicated. Technically, a country cannot bind a person or company who is not located in that country, but they do have the right and ability to control activities that happen within their border and that affect their citizens and residents.

In the foundational United States Supreme Court case Marbury Vs. Madison, the court affirmed the basic legal principle that if there is a vested legal right that has been violated, then the court must offer a remedy [5]. If a country or state makes a law affording its citizens and legal residents a right, then violations of those rights must be capable of being remedied. In order to get a remedy from a court, the court must have the authority to make a valid and enforceable order over the defendant. Thus, in order to bind a company from country A, who has violated the rights of a citizen in country B, based upon a law passed in country B, country B must be able to enforce the law over the company in country A. The court in country A must have jurisdiction over the company.

Some Jurisdictional Background

One of the first and most notable legal topics that every first-year law student encounters is Jurisdiction. Simply put Jurisdiction is a fancy term for describing whether a court can make a binding order over a party in a case. Without jurisdiction, there can be no case and no remedy.

There are two types of jurisdiction: subject-matter jurisdiction, meaning what types of things the court can make orders regarding and personal jurisdiction, meaning who the court can order to do things [6].

The types of cases that a court can hear (subject-matter) are generally established by legislation or constitution. For example, an immigration judge in the United States only has jurisdiction to preside over immigration law cases or cases concerning federal immigration laws. This authority was granted to the Attorney General by congress and delegated to the immigration judges [7]. The immigration law judge does not have jurisdiction to adjudicate a medical malpractice claim. Each court has its own rules regarding what types of cases it can adjudicate.

The parties that a court can issue orders to (personal jurisdiction) are determined based upon where those parties are located and where the facts giving rise to the action occurred. If a party
is a resident in the jurisdiction where the court is located, that court generally has jurisdiction over that party. If I live in Boulder, Colorado, then the Boulder District Court has jurisdiction over me. Similarly, a court has jurisdiction over the parties whose conflict arises out of events occurring in the court’s location. If I get in a car accident with another driver in Denver, CO, about 30 kilometers from Boulder, the Denver District Court has jurisdiction over myself and the other driver because the accident occurred in that court’s jurisdiction. Other courts may also have jurisdiction over this car accident based upon principles of concurrent jurisdiction (more than one court meets the rules to have jurisdiction) or diversity jurisdiction, which allows cases to be removed to a federal court if the parties reside in two different jurisdictions and meets the standards specified in the federal rules of procedure. Additionally, every jurisdiction tends to have its version of a long-arm jurisdiction statute, which specifies additional scenarios that allow the court to have jurisdiction over a party. These scenarios are beyond the scope of this article.

In order for a court to have jurisdiction to issue valid orders, the court must have both subject-matter and personal jurisdiction. So, if I want to get an order from a court, I need to make sure I file in the right type of court and the right location (where the parties live or where the events occurred). If someone gets harmed, they can seek recourse where the harm occurred.

But what if it is not clear where the harm occurred? This question came up before the United States Supreme Court in a now famous case, called International Shoe v. State of Washington [8]. In the case, a company incorporated in Delaware, called International Shoe, whose principle place of business was in Missouri, was being sued by the State of Washington over unemployment contributions that International Shoe claimed it was not required to make because it had no employees (as that term is defined) in Washington. International Shoe had no manufacturing and no offices in the state of Washington. It did, however, have salesmen who resided in Washington who were managed by a team in Missouri. These salesmen were selling in the state of Washington, received samples from International Shoe and were paid commission for these sales. In this case the court established that a corporation could be subject to suit if their minimum contacts were sufficient to render suit fair and just under the due process clause of the United States Constitution. In making this minimum contacts analysis the court looks at whether the company by way of its activities in the state or has availed itself of the benefit of the laws in the state intentionally targeted that state. The Court found that International Shoe had made substantial and continuous activities in Washington to render them subject to the courts in Washington. As a Supreme Court opinion, the lower courts thereafter followed this minimum contacts analysis in determining whether there was personal jurisdiction over a defendant in the United States.

**Jurisdiction and the Internet a changing landscape**

Let’s assume that I am sitting in my office in Colorado and purchasing a product from a company whose headquarters are in California, but is incorporated in Delaware. My payment is processed in Cincinnati, my product is made in Taiwan and is shipped to me from a warehouse in Kansas. Furthermore, let us assume that the company’s website is being served from a large data storage cite in Arizona. My product arrives and it is defective in some way. Which court can I sue the company in?

A good law student would note that, your safest bet is Delaware or California, where the company “lives.” However, a good civil procedure professor will note that your client does not want to travel to bring a case against the company in California or Delaware. Furthermore, why should your client need to travel, your client never left their home and was harmed. Did the company target Colorado somehow? Well, the site was available in Colorado as it was everywhere. How do I determine minimum contacts over the Internet?

In Zippo Mfg. Co. v. Zippo.com Inc. the Western District of Pennsylvania was faced with the same question. The Court developed a sliding scale analysis known as the Zippo Framework. The court noted:

“This sliding scale is consistent with well developed personal jurisdiction principles. At one end of the spectrum are situations where a defendant clearly does business over the Internet. If the defendant enters into contracts with residents of a foreign jurisdiction that involve the knowing and repeated transmission of computer files over the Internet, personal jurisdiction is proper. E.g. CompuServe, Inc. v. Patterson, 89 F.3d 1237 (6th Cir.1996). At the opposite end are situations where a defendant has simply posted information on an Internet Web site which is accessible to users in foreign jurisdictions. A passive Web site that does little more than make information available to those who are interested in it is not grounds for the exercise of personal jurisdiction. E.g. Bensusan Restaurant Corp., v. King, 937 F.Supp. 295 (S.D.N.Y.1996). The middle ground is occupied by interactive Web sites where a user can exchange information with the host computer. In these cases, the exercise of jurisdiction is determined by examining the level of interactivity and commercial nature of the exchange of information that occurs on the Web site. E.g. Maritz, Inc. v. Cybergold, Inc., 947 F.Supp. 1328 (E.D.Mo.1996)” [9].

About half of the US Circuit courts have adopted the Zippo framework [10]. Some have stuck with the International Shoe minimum contacts analysis without using the Zippo framework [11].

**Foreign Orders**

In general, Courts have rules about when they will or will not enforce a foreign order. In the United Stated, we have a Constitutional provision that governs the enforcement of laws from another state within the United Stated referred to as the full Faith and Credit Clause.

Whether a foreign order (an order from a court outside the United States) will be enforced in the United States usually depends upon whether the country issuing the order (i) had a jurisdictional framework similar to those in the United States and (ii) does not have human rights abuses.

Colorado’s formulation of the Uniform Child Custody and Jurisdiction Act (UCCJEA) is a good example: “a [child custody] determination under the factual circumstances in substantial conformity with the jurisdictional standards of this act must be recognized and enforced. . .” unless “the child custody law of a foreign country violates fundamental principles of human rights [12].”

The European Union has a similar jurisdictional framework to that in the United States including a provision that is very similar to a minimum contacts type analysis:

“(15) The rules of jurisdiction should be highly predictable and founded on the principle that jurisdiction is generally based on the defendant’s domicile. Jurisdiction should always be available on this ground save in a few well-defined situations in which the subject-matter of the dispute or the autonomy of the parties warrants a different connecting factor. The domicile of a legal person must be defined autonomously so as to make the common rules more transparent and avoid conflicts of jurisdiction.

(16) In addition to the defendant’s domicile, there should be alternative grounds of jurisdiction based on a close connection between the court and the action or in order to facilitate the sound administration of justice. The existence of a close connection should ensure legal certainty and avoid the possibility of the defendant being sued in a court of a Member State which he could not reasonably have foreseen. This is important, particularly in disputes concerning non-contractual obligations arising out of violations of privacy and rights relating to personality, including defamation [13].”
Conclusion

The diffuse nature of the Internet has upended the traditional notion of place. Interactions now span the globe. Participants in an interaction may or may not even know where one another are physically located. Furthermore, they may not even know additional parties had been involved in a transaction. In such a landscape how can a court definitively state that a party should have foreseen being dragged into a particular court? However, how can a harm have no clear procedure for recourse simply because it occurred over the Internet? If I can sit at home and be harmed by someone a great distance from me, why should I have to travel to where they live to raise a grievance. This reality has forced courts all over the world and parties operating over the Internet to re-imagine how jurisdiction works. Some are preparing to meet the strictest standard while others are tailoring their activities to limit the scope. Many parties have opted to include arbitration provisions in their terms of service in order to avoid courts altogether.

Numerous international organizations exist, whose aim and goal is to standardize international Internet governance. For example, the United Nations Education Scientific and Cultural Organization (UNESCO) has put out an Internet governance glossary that includes intergovernmental organizations and Internet specific organizations that are involved in such efforts. I must note ACM is not on this list [14]. If we, as a society can come together through such organizations to determine technical standards for the Internet, we should be able to standardize the legal rules of the Internet in a similar fashion.

Disclaimer

Jurisdictional laws are highly dependent upon the circumstances of a particular case and the laws of a particular location. Statements regarding jurisdiction in this article are not to be taken as legal advice and may not be applicable in a particular case. If you need an opinion regarding the proper jurisdiction for a specific matter, you should contact a local attorney.

References


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News

Supreme Court Rules in Favor of Google

From Google LLC v. Oracle America, Inc [1]: "Oracle America, Inc. owns a copyright in Java SE, a computer platform that uses the popular Java computer programming language. In 2005 Google acquired Android and sought to build a new software platform for mobile devices. To allow the millions of programmers familiar with the Java programming language to work with its new Android platform, Google copied roughly 11,500 lines of code from the Java SE program. The copied lines are part of a tool called an Application Programming Interface (API). An API allows programmers to call upon prewritten computing tasks for user in their own programs...

Held: Google’s copying of the Java SE API, which included only those lines of code that were needed to allow programmers to put their accrued talents to work in a new and transformative program, was a fair use of the material as a matter of law."

REFUSING TO UNMAKE THE LEMONADE, OR HOW NOT TO GO BACK TO NORMAL

BY MICHELLE TRIM

Keywords: Race, Identity, Computing Education, Computing Culture, Organizational Change, Participation
Categories: Social and professional topics → Computing / technology policy

With the Covid-19 vaccine newly eligible for the entire United States’ adult population, many parts of the country are pre-emptively calling for a return to normalcy. While new variants are surging in India [1], restaurants in the U.S. are opening, and even roller-skating rinks, gyms and casinos are opening their doors [25]. For now, things still do not look like they did before spring of 2020 when most of the world went into varying levels of quarantine. Folks wear masks, for the most part correctly, and tape on the floor in grocery stores reminds shoppers to stay 6 feet apart. In my own state of Massachusetts, many of my fellow parents and I rejoiced when our children returned to school in the second week of April. Between Zoom fatigue, social isolation, and even the loss of loved ones due to this pandemic, many are eager for things to go back to the way they were before. However, the moment of reflection that this pandemic afforded us must not be relinquished so easily. With accountability, but not justice, achieved after the verdict in the murder of George Floyd [14], organizations across the U.S., have mobilized to improve inclusivity at minimum, with many seeking to go further and dismantle systemic racism [37]. Perhaps the uncertainty over what life will look like from one day to the next has enabled more people to pay attention to the reports of protests over the killings of Black people by police [34]. Those protests may be playing an even bigger role as “municipalities where BLM protests have been held experienced as much as a 20 percent decrease in killings by police, resulting in an estimated 300 fewer deaths nationwide in 2014–2019” [11]. By knocking most of us out of our daily routines, perhaps more people than usual became inured to the fight against the violence and the everyday racism so many people of color in our country face. Persistence is more than a rallying cry now; it is a description of how more people understand what it means to be inclusive. How will that persistence, that dedication and hardened resolve to ending racism in the U.S. fare once the height of the pandemic has passed and things do go back to ‘normal?’ How do organizations embracing change make that change sustainable [18], and what types of changes can we make that are most likely to enact anti-racism in the long run?

In my almost 20 years of experience as faculty in academia, I have noticed that there is change that happens like a layer of frosting on an otherwise unremarkable cake or change that happens like oil added to a rusty hinge, but there is rarely change that truly disrupts the status quo. For example, a couple of years ago I shared with one of our recently hired directors of diversity my aversion to using the word ‘freshman.’ I quipped that our students include people who are neither ‘men’ nor ‘fresh’ and to suggest otherwise is to render invisible those who don’t fit. My comment struck a chord, and that diversity director started a communication push toward using ‘first-year’ and away from using ‘freshman’ in our college. In a fairly short time, I noticed that ‘freshman’ appeared in fewer places in my college, and I noticed people in positions of power also shying away from using it. There was no mandate that I am aware of, and yet within a couple of years of that comment, one must now look hard to find ‘freshman’ in regular use in our college, and when it does appear, it almost always signals a role distanced from teaching. This one change is small, and it does not move the needle much at all in terms of combating sexism or ageism in the university. However, what I find interesting about a change like this is the opportunity it presents for conversations about other kinds of change. The ease with which this change has been accepted suggests that it provided an accessible means of performing social responsibility that felt comfortable to many.

The other kind of change that academic departments seem able to nimbly enact comes often in response to annoying, disturbing, or just plain loud complaints. This kind of change is reactionary, rather than proactive, and it tends to happen when a particularly important constituency expresses unhappiness. For example, faculty primarily charged with carrying out research in a department may express aversion, even distaste for being required to attend undergraduate events or to discuss research opportunities with master’s students. Perhaps faculty are being asked to provide support at weekend admissions events, to engage in undergraduate advising, or to attend evening social events for current students and/or alumni. It is not uncommon for faculty to complain about these kinds of obligations, and many of those complaints are likely well-founded. Faculty work long hours and may see evenings and weekends as precious time for recovering from the stresses of the workweek; faculty may have caregiving obligations at home that make attending any events outside of business hours a challenge. In other situations, faculty may see their mission as one that primarily concerns their research productivity, and any duty or task that takes time away that could be spent on research is a distraction from what is important. In these cases, the loudness of the complaints comes less from the enervating way they are made and more from the privilege of those individuals. This relationship is shown when change is enacted to quiet the ‘squeaking.’ These sorts of changes can be expensive, but because they are structural they often have lasting impact. Implementing them is rarely a mission of winning hearts and minds but is instead a result of top-down directives, sometimes couched in faculty retention.

We see a similar set of changes playing out in industry. Optical enhancements happen with frequency now; “Black Lives Matter” banners appear conspicuously on social media sites and company messaging; content providers showcase curated category variations on “Black Voices” [33] or Black music playlists [3][31]. Some sites even showcased picks for products and media for “Women who Dare” for women’s history month [2]. Appearalment has made regular appearances as well. Recent ad campaigns by Apple signaling their commitment to user data privacy, carving out a marketing campaign appeasing those who feel higher price tags should come with more agency over their personal information [4]. Facel
When it comes to anti-racism work, to understand the new normal. 'Just do good' in an optical or appeasement sort of way toward 'make doing good the new normal.' The reason is that superficial or reactionary change is whimsically dependent on lines of power and privilege, skipping the step when a community establishes and then commits to a specific set of values. Without those shared values, any change is difficult, maybe impossible, to sustain.

I’ve noticed myself moving away from ‘just do good’ in an optical or appeasement sort of way toward ‘make doing good the new normal.’

In addition to the importance of establishing shared values, the kind of change needed the most almost always requires a degree of philanthropy or even altruism from the community. So, when we ask for change, we are asking those with privilege to participate in a values adjustment and also to give up something, to embrace discomfort [24]. When it comes to anti-racism work, to understand how we consider the impacts of the products we make [21], how we hire employees and professionals [20], how we teach our students [16], and how we treat each other as fellow humans, values and privilege are at the center [27]. For computing, these concerns are incredibly immediate because we entered the pandemic with a deficit in terms of reckoning with the white supremacist values that had permeated our field, however unintentionally [17]. For example, when we said “CS for All,” [9] and everyone tried to carry out their lives for a year over email and Zoom, I wonder how many of us considered access to bandwidth, computers and space to use our computers. Like many others, I couldn’t use Zoom backgrounds for the first six months of the pandemic due to hardware limitations. While the chaos of my life in the background may be embarrassing, that is nothing compared to what others faced. One colleague could only do Zoom meetings in her car as her living space was too cramped to permit professionalism or privacy. Some of my students didn’t have working cameras and others had no quiet or private space to work. And considering all of this, how many of us wondered to what extent race and gender might play a role in these access concerns? This question of access made economic disparity visible to industry, to the public, and to academic departments [30]. And yet, how many of us in colleges and universities returned to our department meetings with this knowledge of disparity, of inequity, in our hearts and on our tables for discussion? I am guessing that the more common outcome looks a lot like my own department. Groups of us banded together writing grants for scholarships or troubleshooting pedagogical approaches or planning exams that mitigate the inequities in front of our faces. We couldn’t ignore the problem of bandwidth or file sizes when students overseas in areas undergoing civil unrest [10] had unreliable infrastructure and expensive data plans. From our privileged spots in the U.S., we couldn’t ignore the problems of VPNs and our international multi-lingual students accessing everything from a non-English speaking context, and thus having limited language support for interpreting directions for assignments. Like many across the country, we mitigated this by adding captions to our videos and by making content available without the need for VPNs, and a very small number of us went that extra mile to edit those captions to make them accurate, a task often hours in the making depending on our own avoidance of idiom and performance of perfectly punctuated midwestern U.S. English.

Forgetting about Zoom for a second, most of us noticed the grocery store workers, the postal carriers, and the delivery drivers in ways that we hadn’t before because they could not do work from home over Zoom. We required their presence in order to carry out our lives. Most noticeable of all for those of us with school age children in the U.S. are the secondary and elementary teachers in our public schools. Here in Massachusetts, my school-aged children spent most of an academic year on lockdown. For over a year the conspicuous necessity of elementary school to my own sanity and productivity was felt acutely and likely shared by many. But, no one in my house has a health condition that makes Covid-19 any more dangerous for us than the average person. So, I had the privilege to whine and complain, to squeak, about the absence of school in my kids’ lives, never having to worry about what extra exposure to the virus could bring me or those I love. Likewise, I have a job that I was able to do from home, so I never had to make the choices that grocery workers and postal carriers, and delivery drivers had to make. And yet, for the life of me I cannot recall a specific example of any of those folks ‘squeaking’ about their situation, though, perhaps, the issue is that their complaints never made my newsfeed. What is perhaps different for folks like me, middle-class white folks able to work from home in a pandemic, is the way that all that time at home made happenings online or in the news constantly available for contemplation. Having to teach my kids as well as my students meant explaining the election and social media and misinformation [22] and insurrection [23] and mob violence [5] to my 9- and 11-year-olds at the same time that I was making sense of these events for my college students and for myself. As technology became the center of our lives, the mediation of our lives by technology became the subject for my courses and my quality time with my kids. Assignments in my undergraduate ethics course asked students to analyze texts produced by tech companies to see if they could discern social changes made to benefit society from those made as part of a branding strategy. To be seen as a change maker, as a participant in combating violence against people of color carries more cultural capital now than it did two years ago. Technology has made possible the sharing of videos, of stories of people’s lives, forcing all of us to face not only injustice, but to educate ourselves as to the particular ways that injustice manifests [35]. We’ve seen so many videos of police violence against Black people at this point that its reality as a feature of American society is inescapable [32]. So many images proliferate of courtrooms, and crime scenes, and perp walks in the aftermath of mass shootings, including those with a preponderance of victims who identify as people of color, that I struggle to see how white people can avoid empathizing with the real physical danger that so many of our neighbors, and colleagues, and students face just by being in this world with us. There are mainstream venues now for understanding tone policing against women and against Black women in particular [29], for understanding how Asian culture gets appropriat-ed and exoticized, dehumanizing women [13] and men of Asian descent [19], and for recognizing the need for gender plurality in our communication so as to not erase our non-binary or trans members of our community [15]. These are not calls for adopting a more “PC” (politically-correct) manner of discourse; these are demonstrations of others’ lived realities.

In all of this visibility, there is a kind of lemonade being made from the lemons of remote education and home quarantines. The question before us with the Covid-19 vaccine available to everyone 16 years of age or older in the United States is what are we going to do with that lemonade now? We’ve consciousness-raised, we’ve conferreded and consulted, we’ve contemplated our place in the power and privilege hierarchy and we’ve found many of our organizations and institutions wanting in that process. Now what? What is next? How do we convert this unsolicit-ed pause and shared understanding into sustained movement towards change? Angela Davis says that “freedom is a constant struggle,” and I have always taken that to mean that the work necessary
We as a field and an industry must disallow complacency. No achievement is enough; no application or technology is 100% fair and inclusive, and no initiative is truly self-sustaining or fully comfortable.

for equity to thrive is never ending [12]. So, that is the first thing we must do. We as a field and an industry must disallow complacency. No achievement is enough; no application or technology is 100% fair and inclusive, and no initiative is truly self-sustaining or fully comfortable. If we begin there, with that shared assumption of this work never being finished, and it may never be comfortable, then I think we are positioned to begin the work that doesn’t only improve the optics for ourselves or our organizations and that doesn’t only reward the privileged squeakers with the interventions they seek. We need to identify the structures within our organizations that inscribe inequity. We need to ask ourselves, sincerely, do we really want CS for all? Do we really want our technologies to be fair? Do we really want people of color and women to join our departments and our engineering teams and our leadership circles? Because if the answer to any of that is yes, then we need to be serious about what unfair advantages many of us have that we are willing to give up to achieve that future.

A recent article I read argued that instead of microgressions, we should be focusing on microrewards. The author states: “Naming microrewards demands that all individuals fight white supremacy, rather than gaze sorrowfully at the plight of marginalized colleagues that somehow no one is responsible for.” The argument is that “naming the daily microboosts that are visible in data about our performance … gives us new, more specific language to hold ourselves accountable.” [6]. By pointing to all the undeserved advantages many of us take for granted, we account for our privilege in concrete accessible ways. In terms of capturing and building from noticing inequity to doing something about it, these sorts of easy, low-hanging-fruit steps seem like things all of us should work to normalize. All organizations should have at least some public acknowledgments that women and other marginalized people within computing experience the world differently and that it is incumbent upon those who occupy majorities to understand those experiences. Tiny niceties, like frosting, that all of us can enact include naming our pronouns without being asked; examining our examples in scholarship, presentations, and lectures to make sure they are representative of the diverse world around us; shutting up in department meetings so that newer faculty, women, and faculty of color have space to speak; listening when people tell us about how they are experiencing our conference rooms, our classrooms, and our office spaces; and learning to pronounce names correctly, even asking for help until we get it right. These are tiny things. These are not things that cost much privilege to buy. Yet, these tiny things make our spaces more welcoming, more comfortable for those who otherwise might stay silent. This is a beginning, and I like to think that this is where many of us in computing are at today.

A layer of frosting on our otherwise uninteresting organizational cake is not enough to allow us to keep our lemonade, however. If it took the pandemic to get us to this point, what will it take to get us to move toward real change? And what does real change look like? Taking Dr. Nick Washington’s 3Cs Cultural Competency in Computing course [36] right now, I’ve come to realize just how much knowledge of power, society and human interaction is required for Black women in CS, for marginalized people in CS, to navigate these spaces, let alone to ever feel at home. So, here I encourage everyone to look at the deep structures within your organizations. Look at hiring practices, admissions policies, promotion guidelines, merit pay descriptions, and awards. Pipeline efforts to increase the number of women and marginalized people applying to CS jobs and academic programs are well and good, but for those of us with the money and resources to engage in those efforts, I’d like to know what deep structural change has been enacted to keep those people there. What are the retention numbers in your organization? Are they public? Why not? From the beginning space of creating a welcoming environment, we must enact the deep structural change that enables difference to do more than survive – it must thrive [28]. What rewards does your organization offer to incentivize non-marginalized folks to learn how their practices must change? What incentives do institutions offer organizations to enact that change? And, when we measure how well we are doing, are we looking at retention with the same care that we are examining recruitment? I ask this because unless an organization’s retention of women and people of color is at least the same as that for white male-identified people, then solving the pipeline problem will never solve that organization’s representation problem. This past year has been incredibly difficult for me personally and professionally, and yet nowhere near as difficult as it has been for many others. I refuse to unmake the lemonade coming at the end of this crisis, and I intend to continue to work hard, to struggle, and to push for real structural change because we shouldn’t need a pandemic to teach us that we are all in this together.

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THE ETHICAL DIMENSION OF INFORMATION TECHNOLOGY

BY

SUAD ALMUALLA

Keywords: Algorithms, Decision Making
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We take technology for granted as one of the greatest inventions and as something that makes our lives better and easier, but technology has shaped and is continuing to shape and transform our lives the ‘good’ and ‘bad’. As communities living in the information age, the way we learn, shop, socialize and communicate has become drastically different. and the more technology is becoming ubiquitous, the more we are altering our lifestyles, our choices and even our political stances adopting some extreme or absurd views because of the influence of algorithms (algorithms are computer instructions in social media and other websites that chooses contents for viewers based on the assumed viewer preference or interest).

Think about the social media influence. Mobile apps made social media both popular and possible, people would have never bothered to tweet every minute if they had to open their desktops and search for social media platforms (O’Leary and O’Leary, 2004). Apps and mobile technology gave life to social media and social media presence brought about an influence; everyone is tuned to them; are we connected or disconnected? Are they enabling socialization? or enforcing some sort of social isolation and loss of social skills? (Turkle, 2011).

Psychologists say that people acquire social and emotional intelligence through interactions in social settings (Ang and Van Dyne, 2015, p.292), but if most of our socialization is virtual, are we learning any actual social skills? Some technology enthusiasts would say, hey, life is changing; and we can have a life in cyberspace where we fall in love and make friends just as we do in our traditional life.

What about algorithms? Are they helping us to make better decisions? or forcing us to adopt certain ideas that we would not adopt if we were not in tune to the news feeds of say Instagram? Is technology of today truly a pull technology (as opposed to push technology) where we assuming-ly pull or ‘choose’ information to watch whatever content we want from YouTube, Netflix? or is it a push in disguise? Guided by push algorithms that decides for us what to watch and hence what to think? The racists, the extremists are becoming more racist and extreme because in their news feeds they are being forced by algorithms to view what feeds their ‘assumed’ preferences. (Pew Research Center, 2021)

Within the past twenty years alone we have witness the emergence of some new exciting technologies. Mobile phones, cloud computing and the ability to do office work without the boundary of an office, the Internet of Things such as Smart Homes and fit bits which study our feelings, behavior and our biological indicators to better serve us. But aren’t these technologies spying on us? spaying on our feelings, behavior, locations?

Is our information being collected secure? Is there any chance of breach or hack? What will happen if we lose our privacy and information that we don’t want to share? Information such as ‘the days on which we get depressed’, ‘information about our health’, ‘the number of times we order junk food’, ‘the number of times we were reckless at driving’. Information is a commodity; such pieces of information could be data mined, combined, analyzed then sold to companies that could make decisions about car insurance prices, life insurance prices, bank loans, job offers and many other opportunities that we might lose because every aspect of our life is being monitored and registered by the gadgets that are near and dear to us.

The Web itself is one of the amazing inventions of the 20th century. It brought about an explosion of trillions of pages and made it possible to access vast amounts of information with the click of a mouse; we truly live in the Information Age! Yet doctors amongst many other professionals are suffering from the public loss of trust. When it comes to doctors, everyone seems to know more about their illnesses than the doctors themselves; patients come prepared with something they read on the internet or saw on social media regarding symptoms or medicine. The days on which people used to respect professionals because they are educated enough to know better are gone.

People lost trust, not only in doctors, but in vote results as in the Capitol incident in the United States and lost trust in government plans such as the recent plans for vaccinations; loss of trust is being fed by the giant machine of misinformation backed by the abundance of information coming from social media and the algorithms which sway opinions and distort reality.

Sources of information such as magazines and newspapers fear for their reputation therefore, they are careful about what to publish; news outlets follow principals of accuracy as much as possible. However, on social media, everyone can create news; everyone is both a journalist and a news outlet. Information is circulating at a tera-byte speed where we are bombarded by ideas, news and recommendations and most of it is useless, inaccurate or fake.

Technologists who create, manage, and regulate the use of technology must ask which principals of ethics are violated due to the development or management of a certain technology; asking: is it harming society? Is it bringing about happiness, trust, co-existence? or fueling hate, jealousy, sadness and destruction? And what sort of solutions do we need to devise, whether technological, societial, policy or managerial, to make our societies happier, wealthier, more flourishing. The development and management of IT requires more than the technical knowledge of programming and system development.

Our relationship with technology is complicated. We create technology and choose to adopt it. However, once we have adopted a technological device, it can change us and how we relate to other people and our environment. (Quinn, 2011)

As technologists we must ask ourselves; is technology driving us? Or are we driving technology?

References

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The contemporary and post-contemporary world is mediated by technology. These days in economies all over the world the increase in the labor market demands professionals that are able to deal well with technology. As well as that, becoming an engaged citizen in a technologically driven world requires a minimal digital literacy expertise. With the high interest awakened by the 21st century competences applied to formal curriculum (from primary to high education, for world educators and authorities), it is not surprising that computational thinking and programming are issues that play an essential role in educational research these days, as well as it has become a significant issue addressed in the educational public policies [2, 26].

That makes research regarding teaching and learning programming approaches even more relevant. But what became clear from the reported advances is that there is no “The ONE” general solution, that will cover all learning issues, that will be adaptable for all teaching practices, or that fits for all institutions nor that is suitable to all institutional contexts. The one solution is far away to had been founded, even it was possible and it actually exists, it will be naive to believe that was something easy to put together, that was not composed by such complex changes and it would be easily implemented without any resistance by the learning process players. Moreover is hard to believe when it applied in real contexts that will always guarantee the same highly positive results reported in its experiments.

For real, many students consider learning to program a difficult task [11, 15, 23, 25]. Many reasons can be identified to justify their opinion and difficulties, which contribute to the high failure level and dropout rates reported in a great number of introductory programming courses worldwide. Although various proposals can be found in the relevant literature designed to overcome these learning problems, including methodological approaches and computational tools that are intended to facilitate programming learning, the problems persist. That is why this subject still making the case for continued search for new approaches that may help to reduce students’ learning difficulties [7, 8, 12, 16, 22].

Recent educational approaches demonstrated the importance of paying attention to students’ emotional issues (which is essential to K12 and high school students as much is also valid for freshman and sophomores), as well as, the relevance of investing in rich learning contexts, including meaningful pedagogical activities, motivation to learning and coping strategies. Following a similar baseline we designed the general guidelines of a pedagogical strategy for programming classes to help turn the study of programming more appealing and effective, especially to non-majors and novice programmers at the University of Coimbra [13, 20].

Previous research work where a pedagogical strategy to support learning programming was designed and previously tested with positive results related with the student’s engagement and dropout preventing [17]. So these research outcomes were used to justify the structural and the teaching practice changes the researchers want put into the first programming course for the Informatics Engineering Department (DEI in Portuguese acronym). The outcomes of Martins [17] research through the design and the pilot-experience of new Programming course (PROG in Portuguese acronym) brought many pedagogical recommendations aimed at communication between lecturers and students easier, which was observed as relevant to raise students commitment to their actions to be or not successful in the course.

The experience and the results from PROG demonstrated that some learning activities contributed to more independent and responsible behavior among students as well as that better subsequent learning progress measures and coping strategies are essential to prevent dropout rates in programming classes. The research recommendations were used as the baseline to reformulate the traditional first programming course IPRP (Introduction to Programming and Problem Solving in Portuguese acronym) into an updated IPRP version started in the 2011/12 academic year [13, 21]. More about the acronyms used in this paper can be found in the Appendix section.

After five years, it is essential to revise the pedagogical strategy requirements and analyze their human factor impacts, especially the aspects related to their effectiveness to promote, or at least to stimulate, a significant behavioral change among teachers and students, positively affecting teaching
practice and study behavior. So, a new independent research, an ethnographic study with focus on teaching assessment is underway by researchers who proposed the pedagogical strategy. The present study focus on Human Factor impacts, and this paper present an exploratory research where the goals are to get to know better about:

- the necessity of revision in the original pedagogical strategy’s requirements;
- analyze the teachers assessments as the context of deep study of the requirements to stimulate students to engage with new study behavior as well as to motivate teachers to perform motivational intervention in higher education:

The next sections present a summary of the original research context that set the conditions that led to IPRP updated version, including the results of IPRP progress made by other DEI researchers and this independent study requirements.

2 A Pedagogical Strategy for Programming

The theoretical background and the previous related work regarding the present ethnographic study were based on my PhD research developed at the Center for Informatics and Systems at the University of Coimbra (CISUC), where I designed and implemented a pedagogical strategy approach to support a new programming course, defining an updated class model, composed by recommendations to contextualize an ordinary programming syllabus into an updated classroom dynamic, teaching practices and learning activities [17]. Those research outcomes inspired the structural changes in classroom model approved by the scientific commission of the Informatics Engineering Department at University of Coimbra, responsible for the programming courses for the undergraduate degrees in Informatics Engineering (LEI in Portuguese acronym) and in Design and Multimedia (LDM in Portuguese acronym).

All changes proposed by my PhD research were designed with the specific goal of preventing students from giving up the first programming classes prematurely. Related literature and previous study from 2007 showed that students did not seem ready to assume a leading role in their programming learning process and their motivation, self esteem and willingness to learn were simply not high enough [11]. The dropout rates in the first programming course, the IPRP course, in both undergraduates at DEI were very high and the course retaking had not improved, actually it even increased, after the IPRP curriculum updates performed in 2005 and after in 2008 [13, 21]. Looking for new inspiration to the design a new didactic approach and learning contexts for programming learning, independent in each educational level programming and computing thinking are included, even more desirable [2, 12, 14, 26].

2.1 Theoretical Inspirations

The research main goal was not to design “THE” strategy that can be used in deep-seated ways, without a revision of its requirements, to be applied to any programming learning environment. The research aim was to define a set of guidelines regarding contexts, didactic activities, tools and motivational measures that may assist teachers to turn their own programming didactic practice around, also it could open room to inspire department lecturers to create their own specific learning contexts for programming as suggested by Collins [5] and Biggs [3]. The strategy main changes proposed were defined by the triad components: classroom dynamics, contextualized learning activities and following learning strategies.

The strategy proposal was inspired by Lipman didactic metaphor Community of Inquiry [7], considered an adequate approach to create a contextualized learning environment and classroom dynamics to develop important reasoning skills. The proposed classroom approach includes didactic activities planned to strengthen the students problem solving skills and their involvement with individual learning process [18]. Collaborative tasks, like small projects, research activities, peer tutoring, and continuous assessment were good examples that were tested. The context also included computer-based tools to support programming concepts, such as algorithm simulation tools or software to support competitions. To stimulate extra-class activities and to facilitate monitoring and continuous assessment tasks, it was considered important to use a Learning Management System (LMS).

Additionally, a good in-class communication was crucial, but sometimes the communication channels shared were not enough, or at least they were too impersonal, as some students have difficulty to talk directly with the teacher, and the teacher cannot listen to all students at the same time. Also it was important to include in the strategy some way to promote student reflection about the course and their own learning process [10]. Those were the reasons to include in the strategy a biweekly reflection that students are expected to write in the course LMS. In each reflection students have to write about what they learned in the previous two weeks, the main difficulties felt and their reasons, what they think about the course activities and pace as well as any other aspect they felt relevant. Each reflection was only accessible to the teacher and the student who wrote it. Reading the reflections helped the teacher to identify each students specific difficulties and feelings about the course, allowing him to perform group or individual interventions to address solutions to the identified problems. Also having to write the reflections with the certainty that they would be read surely should force less committed students to assume that fact to the teacher, which by itself may induce some behavior change, as possibly the student wouldn’t like to write that again in the next reflection [19].

The teachers were expected to give particular attention to students motivation. One key issue is to make students aware that the teacher notices their efforts and improvements. For example the teacher can highlight the fact that the students were able to solve a problem that she/he couldn’t solve in the past. The general idea is to give students the certainty that their progress in class is being followed, make them feel their individual efforts have been considered and that the teacher observes their confidence needs.

Following the Design Based Research (DBR) guidelines [4], the pedagogical strategy proposes a significant change in the traditional class model of the Introduction to Programming and Problem Solving course (the Portuguese acronym is IPRP), its classroom dynamics, as well as its teacher’s pedagogical practice at the Department of Informatics Engineering. It was put into practice in the context of a new programming course, the Programming course (the Portuguese acronym is PROG), designed especially for the Design and Multimedia Master’s program (MDM in Portuguese acronym). The PROG course had the same syllabus as IPRP but the learning activities were deeply contextualized in synergy with the students background in communication, arts and design. That course was developed during three academic years between 2008 and 2011, and the results were considered very positive by both the students and the lecturers involved, especially the outcomes in terms of course success and dropout rates. All details regarding the strategy development process as well as its experiments and results in MDM can be found in the references [17–20].

2.2 A Pedagogical Strategy for Programming

The good results obtained with PROG and its programming pedagogical strategy to support learning programming, despite the fact it was tested in the master degree in Design and Multimedia, inspired a complete revision to change the traditional first programming classes from the Informatics Engineering Department (DEI). In order to make the desirable changes to be more easily executed the scientific commission decided to apply a summarized version of the original strategy recommendations, brought into Introduction to Programming and Problem Solving (IPRP) for the undergraduate courses in Informatics Engineering (LEI) and Design and Multimedia (LDM) only a few components considered essential.

From PROG course essential aspects (classroom model, hands-on project context, program-
ming language, learning activities and evaluation method) [17, 18, 20], the recommendations related to the learning activities and evaluation method as well as to the analysis made of the lecturer’s workload demands inside and outside classes, the scientific commission members considered as not essential to the structural changes desired. Based on this assessment and also taking into consideration the large amount of failed students coming from the last IPRP editions (almost 400 students enrolled in 2011 from three different degrees: LDM, LEI and Industrial Engineering), the updated version of IPRP course for both degrees, LDM and LEI, were defined by the scientific commission as following:

- Use the same PROG class model: no distinction between theoretical and lab practice classes (that class model is the rule for all disciplines in the department), despite the fact that traditional teaching roles such as leading lecturer still exist.
- Students enrolled in IPRP in the same degree will be divided into small size classes, not bigger than 25 students per class;
- Each undergraduate degree, LEI and LDM, will run its specific IPRP course, planned to support its students, because the learning goals and the programming expertise is not the same for each degree. The possibility of mixing students from both degrees will no longer exist as it was common in traditional IPRP in the past or in other disciplines in the department;
- The IPRP workload will be divided into two meetings per week (one class of three hours and another of two hours) and each meeting will not be scheduled on consecutive days in the week or be scheduled on the first and the last week days at the same time.
- Lecturers will be free to take into account, to adopt or not the recommendations for the learning activities and teaching practices presented in PROG. However, even because of the amount of failed students and in order to maximize the chance of these students overcome their individual learning challenges and to perform better in IPRP, no lecturer will be allowed to run only one or more than two IPRP classes.

That IPRP updated version started in the academic year 2011-12, but only IPRP from LDM formally adopted the learning activities and evaluation method from PROG. Thus the IPRP-LDM was compose with the same class model, but also it includes the same programming language (Processing, a programming language designed to and for designers, highly suitable to LDM students profile and background [24]), the same learning context (increasing complexity hands-on projects), the continuous assessment approach through mini-projects, theoretical mini-test and the bi-weekly reflections. These elements were not observed in the IPRP from LEI. Since 2012 another research group composed by researchers from inside and outside the department, developed independent studies regarding the IPRP’s evolution and its students progress in LDM [13, 21]. By these studies it is possible to see that student’s success and approval rate have been very positive over the years.

### 3.1 Participates

In this first exploratory study the sample were composed by three lecturers who teach IPRP to LDM undergraduates. The participants data is presented in the Table 1.

All lecturers are Portuguese, male, with ages varying from late 30s to late 50s. All of them are former Informatics Engineering Department students, but two of them, L1 and L2, have extensive experience teaching programming inside the department, including teaching IPRP for LDM undergrad in both version (traditional and updated). Besides the fact that L3 is new in the Department lecturer’s board, he taught IPRP only in updated version since 2012/13 among others programming course, but he was the only one who had experience IPRP in the traditional version as student and as lecturer.

L1 and L2 were both involved in studies about the LDM students success and its study behavior impacts after IPRP updates through independent studies in collaboration with others inside and outside department researchers [21]. One of the lecturers, L1, also was involved in the original pedagogical strategy developments as well as with the administrative procedures in the scientific commission that led to the updates in IPRP in 2011 [18, 19]. This particular lecturer was also assigned to develop a new programming course in 2016/17 academic year, called the Interactive Multimedia Production course (PIM in Portuguese acronym), as an approach to support digital literacy of University of Coimbra’s policy. The PIM course was designed as a special edition of the original Programming course (PROG), but it took into consideration the organizational structure of IPRP updated version. It is a course designed for international students from ERASMUS program, who are taking the MasteraÁt’s degree in European Heritage, Digital Media and the Information Society (EuroMark degree1, in Portuguese acronym), it took place at Faculty of Arts and Humanities.

### 3.3 Procedure

All lecturers were interviewed electronically between March and June 2017. Two lecturers answered questions through email (L2 and L3), one

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Teaching Experience (years)</th>
<th>Courses Taught*</th>
</tr>
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<tbody>
<tr>
<td>L1</td>
<td>27</td>
<td>IPRP(^1), IPRP(^2), PROG, PIM</td>
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<tr>
<td>L2</td>
<td>20</td>
<td>IPRP(^1), IPRP(^2)</td>
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<tr>
<td>L3</td>
<td>10</td>
<td>IPRP(^2)</td>
</tr>
</tbody>
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\(^1\) IP\(R\)P\(^1\) traditional version, IP\(R\)P\(^2\) updated version, PROG pilot-experiment programming course developed to Design and Multimedia Master’s program and PIM the new programming course developed to Faculty of Arts and Humanities

Table 1: Ethnographic Sample
lecturer was interviewed by Skype (L1), who was interviewed twice, recorded with the permission of the lecturer. The lecturers L1 and L2 received the questions in May, one of them requested more time to develop his answers, because he needed more time to compose a good comparison of his experience in both IPRP versions, the traditional and the updated. The official language of interactions between researchers and interviewers was Portuguese. Due to personal issues of one of the researchers, the second interview with L1 had to be postponed to early June, which delayed the data collection and analysis phase.

3.4 Data Collection and Analysis

Given the exploratory nature of this first part of the entire study, a qualitative study using ethnographic methods was employed [6]. The interview questions were open-ended and covered participant’s general teaching programming experience as well as their impressions about the IPRP changes. The data from all interviews was categorized following the inductive method of analysis described by Bardin [1].

In the answers to the questions all lecturers shared their impressions regarding their experience as programming teachers as well as their assessments of IPRP course, before and after the changes applied since 2011. These questions were trying to understand the specific following issues:

- What are their impressions of the changes implemented in IPRP classes in general aspects?
- How did the IPRP's change impact in students behavior?
- How might those changes impact in their teaching practice?

Using open coding allowed to design a big picture of these lecturers for programming expertise and evaluation. Additionally, through directed coding around the theme Impressions it was possible to categorize the data content of two main categories: Experience and Assessments.

3.5 Results

Our analysis demonstrates the lecturer’s impressions and reactions to the IPRP’s outcomes over the last five years, after the traditional IPRP course was reviewed. The changes applied to the updated IPRP version were based on the outcomes from the experiments of PROG course from MDM and other recommendations detailed in a previous research [17–19].

In general, all interviewers described the transition process of IPRP (from the traditional version to the updated version) in their own terms, since all of them had experienced both versions. In their answers they assessed the impacts of IPRP’s changes to learning progress and developed a comparison of their teaching practice now connected with their previous experience in teaching programming.

In the category Experience lecturers described many aspects where they compare how things in IPRP were before and after the strategy’s updates implementations. They also shared their expectations and frustrations with the class model, especially with student’s behavior, not only in IPRP classes, but with the most core courses. Despite the updates in their own teaching practice over the years, they even after experimented and adopted a diversity of learning activities.

All lecturers agreed with one aspect: the student’s commitment to programming learning demands usually starts late. Since programming is not trivial, becoming successful in this kind of knowledge requires much practice inside and outside classes. Lecturers also agreed that many students only recognize this fact after they had experienced got a bad grade in their first programming test. Lecturers highlighted this point in the student’s experience, was the right time to adopt motivation and self-efficacy measures that make a difference in their teaching practice.

One of the lecturers reported the experience of had been student when IPRP was in its traditional shape, and commented he did not have difficulties to manage to pass in IPRP back then. He credited his good performance in IPRP to the fact he loved programming since he was in high school, so soon he learned which kinds of study methods suit best to programming, because he understood that programming always demanded a lot of time spent in solving problems and practicing programming exercises. This was the only lecturer who believed that changes in IPRP had a little positive impact in student’s behavior, despite it was less than he wanted.

The lecturer who demonstrated the highest experience with the strategy’s elements, who also was involved with its implementations in PROG described the requirements for the new programming course PIM, designed to Faculty of Arts and Humanities. PIM is a special programming course composed by the same elements from PROG, since the programming learning goals were quite the same, but PIM held some differences. What was the same: the class model, the hands-on problem solving context, the programming language, the continuous assessment through exercise lists and mini-projects. What was different: the course had only one 3 hours class per week, no tests applied, only a final project (a 2D game) and no bi-weekly reflections. All students were foreigners (4 Italians, a Danish, a Finnish, a Slovak and a Brazilian), student’s backgrounds were in arts and archeology, none of them had had experienced programming classes (exception made only to the Brazilian). Due to the small group size, the lecturer decided that following students learning progress would be run individually during the classes and through electronic way (email and LMS platform). The classes were run in English. Students present a satisfactory performance and the projects were good, student’s satisfaction reports was not published at the time the interview was done.

In the category Assessments the lecturers shared their impressions about the IPRP updates, describing their assessment regarding its strong and weak points. All of them made a positive evaluation of IPRP update version, especially highlighting their satisfaction with the biggest strategy contributions: the change of the classes model and the separation of classes by degree.

Because of the updated classes model, it was possible to define classes as small groups of students (25 maximum), and became easier to get to know students better (behavior, competences, learning difficulties). That also allowed lecturers to better develop follow-up learning activities in order to check students progress in the course and to perform effective adaptation to the content and to the classes’ pace, or to experience different learning activities. The renewed classes model also allowed students to be kept together only from LDM degree, with similar learning necessities due their backgrounds and profile, which made it easier to contextualize the exercises, projects and classroom examples, since traditional IPRP version put together students from two different degrees, LDM and LEI. All of them highlighted these aspects as some of the elements that might be responsible for the increasing progress of the course approval rates since the updated IPRP version starts in 2011/12.

However, two lecturers also described as negative the fact that the updates were not enough to stimulate student’s behavior change in scale. They comment that even with the new classroom dynamics that brought additional time to develop the practical projects in classes, and different measures offered by each lecturer to individually support the students, the lecturers did not notice increase in students willingness to develop a better study methods or did not observe improvements in students programming study behavior. All three lecturers commented this as a weak point, despite the fact that they reported that students satisfaction with IPRP was high in this version. It has been increasing over the years, inclusive the students final grades and the IPRP approval rates. Lecturers pointed this as the most positive aspect of the IPRP changes, especially because this is another fact that justifies the maintenance of these updates. For one of lecturers, the results with the IPRP updates might encourage teachers to seek

Students present a satisfactory performance and the projects were good...
other updates that might improve the specific aspect of student’s study behavior.

One lecturer pointed out as a negative aspect of this IPRP updated version the difficulties to estimate the real efforts made by each students in their projects. This specific comment was made when the lecturer was assessing the time consuming aspect of IPRP these days in comparison to the traditional IPRP evaluation method. The lecturer justified his assessment based on the time required for them to research in students projects how many pieces of code they had copied from the Web. This lecturer suggested that as much as it was problematic or even not recommended, there is an alternative to provide a “wake up call” measure by changing the IPRP evaluation method, by scheduling and delivering tests in small scale as soon as possible during the course (as it was done in traditional IPRP).

Another lecturer pointed out when IPRP changed there was some apprehension regarding the comparison that students made of teachers practices. Dealing with it was sometimes very annoying because most of the times lecturers understood this as personal criticism when it was not. They wasted the opportunity to review practices when they should have done it. The worse thing was dealing with lecturers that agreed that IPRP changes were good, but some still did not overcome the misconception that IPRP changes were not promoting a progressive discredit campaign of the theoretical classes.

Although the lecturer described as positive the experience of developing and lecturing PIM, he also declared its outcomes were not as positive as he would have expected. Despite the fact he knew that PIM’s student assessed the course as good, the students projects were nice, the grades were high and the positive course approval rate, the lecturer declared disappointed with the PIM evolution and students behavior. Part of this disappointment could be explained by the general assessment the strategy did not make great difference to improve students study behavior. His experience with PIM reinforced this belief, because ERASMUS students were less committed than ordinary IPRP undergrads. That is maybe because PROG and IPRP students had a second programming course to take afterwards, what was not the case in PIM. It was a mandatory course but there is no course that would explicitly use that content as scaffolding knowledge as occurred with PROG and IPRP.

On the other hand, the lecturer highlighted the way that PIM course was set (one single class of three hours per week) was not the most productive way to introduce programming to non-majors. Actually this kind of set was one of the things that he and other lecturers most avoided in IPRP over the years. Not only because this was a specific recommendation from the scientific commission when it implemented IPRP updates, but because lecturers well knew that students must have time outside class to practice, as well as they must be required to get back to the same subjects more than once in the same week to clarify doubts, correct mistakes, overcome misconceptions and reinforce knowledge. He also declared that following measures are relevant to keep students committed with programming learning as was in PROG and IPRP, but new approaches must be applied and incorporated in IPRP as he decides experience to substitute the bi-weekly reflections for electronically monitoring tool [9].

4 Discussion
From this first part of the long term evaluation, it is possible to recognize that regarding teaching and learning programming, there is no unique or magical solution, despite the variety of specific solutions developed over the years, well documented and published in a rich literature available worldwide. It has been describing studies regarding approaches, methodologies, strategies, activities or tools (and its combinations with each other) developed to support teaching and learning programming [11, 12, 14].

The actual computer science education research has been demonstrated that programming is hard to learn and to teach, because that demands a high commitment from both, students and teachers. From the students, they must to develop better study methods and to practice a lot; from teachers, they must to pay attention in the learning context, spend time to follow deeply students learning progress and make themselves available to give emotional support, even in high education [23]. As demonstrated by Martins [17] different studies have focused on presenting learning and teaching approaches that explore the synergy between theoretical approaches with technological tools as the path to engage students and teachers in an aggregation committed to work to overcome the programming learning natural challenges [12, 14, 19, 21, 26].

In the case of the varied recommendations presented by Martins [17] research because of the positive results obtained with PROG, it seems the scientific commission of the Informatics Engineering Department (DEI) decided to focus the IPRP updates in changes to its structural aspects, making it mandatory for both degrees, Informatics Engineering (LEI) and Design and Multimdia (LDM). The commission let as voluntary the adoption of any changes regarding the didactic practice and learning activities listed in Martins’ recommendations.

This study main goal was to develop a big picture of the changes applied in IPRP, either in LMD and LEI. Unfortunately, at this point it was only possible to go deeply in the LDM context, since

The increase in approval rates and the decrease in student dropout rates in IPRP since 2011 was observed in both degrees, LDM and LEI...

The sample was composed by the IPRP from LDM. In fact, lecturers from LDM were open to embrace the IPRP updates with positive expectations because some of them were involved in the developments observed in PROG. Besides these lecturer’s frustration regarding the positive impacts of IPRP changes over students study behavior, all of them agreed that classroom developments and students progress in IPRP have improved since the updates in 2011.

The positive outcomes in terms of students satisfaction with IPRP updates have been officially documented by the students assessment reports developed by the pedagogical office of University of Coimbra, inclusive the IPRP grade of satisfaction is a little bit higher than 4 into the 5 possible points. The increase in approval rates and the decrease in student dropout rates in IPRP since 2011 was observed in both degrees, LDM and LEI, but the results presented by LDM were more significant than in LEI. The data from IPRP progress was documented and reported in independent studies conducted by researchers from inside and outside the department [13, 21] as it is presented in the table below.

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>Approval Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008/09</td>
<td>21</td>
</tr>
<tr>
<td>2009/10</td>
<td>27</td>
</tr>
<tr>
<td>2010/11</td>
<td>20</td>
</tr>
<tr>
<td>2011/12</td>
<td>57</td>
</tr>
<tr>
<td>2012/13</td>
<td>56</td>
</tr>
<tr>
<td>2013/14</td>
<td>69</td>
</tr>
<tr>
<td>2004/15</td>
<td>68</td>
</tr>
<tr>
<td>2015/16</td>
<td>64</td>
</tr>
</tbody>
</table>

Despite the positive outcomes observed in students from LDM, it was expected that changes brought the same positive impact in students from LEI, but that has not been noticed. One of the interviewers did comment the comparison of the approval rates of students from LEI used to vary around 60% to 70% when IPRP was in its traditional shape. Nowadays, the approval rates in IPRP-LEI is around 50%. It is curious to think that things pointed as positive changes in LDM

The documents related to the satisfaction surveys were not officially published at the time this paper was finished in 2018 and the request for that information still pending in 2020.
did not work so well in LEI, because the department managed to deal with the high number of failing students in both degrees during the last five years, even with 80 freshman starting both degrees each year.

It is obvious that most parts of the positive results obtained in LDM are explained by the classroom updates in IPRP. But if IPRP has the same structural aspects (classroom model, hands-on context and workload) either in LEI or LDM, it would be expected that the students progress in LEI was at least similar to those observed in LDM. The lecturers involved in LEI are not the same ones as in LDM, but they came from the same department, following the same didactics guidelines. At this point there are concerns if what matters in LDM does not work in LEI are genuine. In fact at this point concerns about what the researchers expected to find with this study, regarding the impacts of the pedagogical strategy in human factors, have surprisingly changed.

Indeed, all lecturers interviewed agreed that IPRP’s changes did not work to promote a study behavior change in the scale they expected, also it was not enough to imprint great changes in their own teaching practices. Despite that, they also agree that changes were essential to support students to learn better, taking into consideration the number of students who were able to manage to pass in IPRP, which increased over the years, at the same time that the dropout rates decreased. The student’s satisfaction with IPRP is an official evidence in the DEI, since IPRP means are higher than other courses in the LEI and LDM as well as in the entire University.

Despite that the outcomes with IPRP in LEI are not so improved as in LDM, in terms of approval and dropout rates. These outcomes took researchers by surprise, and this led them to pursue other important questions that had not emerged when the study was set: What has been done in LDM that has not been done in LEI to justify both approval rates? If students did not change their study behavior for the better, as well as lecturers teaching practice have not changed, what is going to happen in LEI that could explain its approval results and beyond, it must be reviewed in order to understand what are the new pedagogical strategy requirements? Thus, it is important to pursue complementary research to get to know better clues about how the strategy could be improved to stimulate students to develop better study behavior.

5 Conclusion
These are the results of what has a great potential to be the first step of deeper research to evaluate the human factor impacts of a pedagogical strategy for programming classes at Informatics Engineering Department (DEI) at the University of Coimbra. After five years that my PhD research inspired the didactics updates in the first programming course, Introduction to Programming and Problem Solving (IPRP), for both degrees, Informatics Engineering (LEI) and Design and Multimedia (LDM), it was considered appropriate to proceed an analysis of IPRP developments through an ethnographic study.

It was set at first with the goal of trying to understand what needs to be improved in the pedagogical strategy, based on the lecturer’s assessments, highlighting the IPRP’s changes weak and strong points. The study brought some light to the researchers thoughts regarding the most relevant aspects of the original pedagogical strategies recommendations applied at IPRP, especially by clarifying some misconceptions about the effectiveness of structural changes to improved classroom dynamics, which clearly affect students learning process. The study counts with the assessment of the IPRP-LDM lead lecturer and collaborators. During the process it became clear the documental improvement in IPRP approval and dropout rates. What is more, it raises questions regarding the IPRP potential to improve study behavior or at least lecturer updating teaching practices. The lecturers also reported expectations and outcomes with a new special edition of the Programming course in 2016/17 academic year, that took place at the Faculty of Arts and Humanities, as an approach to support digital literacy at the University of Coimbra’s policy in the curriculum of Information Science degree.

The surprising results obtained with this first part of the underway independent research raise questions about the relevance of checking and rechecking didactic approaches over the times. Beyond the knowledge scaffolding to support the IPRP assessment among lecturers from LEI, it also seeks for clues about the potential improvements in IPRP approval and dropout. The research will still be focusing in analyzed IPRP human factor impacts.

Acknowledgments
The author would like to thank the lecturers from Design and Multimedia degree (LDM) at the Informatics Engineering Department (DEI) at the University of Coimbra for their participation, which made this research possible.

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It is important to pursue complementary research to get to know better clues about how the strategy could be improved to stimulate students to develop better study behavior.


Computing History Fifty Years Ago

In celebration of fifty years of SIGCAS, a quick look back at a few 1971 computing related stories.

First Personal Computer Sold
According to the Computer History Museum, the first personal computer, the Kenbak-1 is sold.

user@remotehost

Sending Remote Email via @
Ray Tomlinson@BBN (Bolt, Beranek, and Newman first uses the ‘@’ in an email sent over a network to indicate the recipient is located at a remote host.

News

Synaptic Transistors

Researchers at Northwestern University have developed an electrochemical "synaptic transistor", which simultaneously store and process information. https://www.sciencemag.org/researchnews/2021/02/210430093230.htm.

AI Policy Forum

"The AI Policy Forum, a global effort convened by researchers from MIT, will present their initial policy recommendations aimed at managing the effects of artificial intelligence and building AI systems that better reflect society’s values". https://news.mit.edu/2021/media-advisory-mit-researchers-ai-policy-needed-manage-impacts-build-more-equitable-systems.

Detecting Gerrymandering

In the United States, based on census data, the boundaries of congressional districts are re-determined every ten years. These boundaries determine which areas within a state, and how many areas, are allocated representatives in Congress. Gerrymandering reflects the process of manipulating these boundaries to "artificially" increase the representation by a particular political party.

Computing researchers are developing symmetry metrics to develop maps that attempt to identify and remove gerrymandering bias.


The Complexity of Theorem Proving Procedures

In the Proceedings of the Third Annual ACM Symposium on Theory of Computing (SIGACT), Stephen Cook proves that "any recognition problem solved by a polynomial time-bounded nondeterministic Turing machine can be reduced to the problem of determining whether a given propositional formula is a tautology". Specifically, his paper introduced the concept of NP-Completeness and proved the 3-SAT (satisfiability) problem to be NP-Complete. This work was cited for Cook received the ACM Turing Award in 1982.

Arguably, as of 2021, the NP vs. P problem remains the most important unsolved computer science problem.
PARTING OPINION

COMPUTING AND SOCIETY:
A FEW FALSE DICHOTOMIES

BY RICHARD BLUMENTHAL

Keywords: False Dichotomies, Computing and Society, Computing and Humanities
Categories: Social and professional topics - Computing / technology policy

Fifty years ago, in the first publicly available issue of *Computers and Society*, one of the articles asked our SIG members and the broader computing community,

“What will my piece of hardware or software be used for? Will it only help some corporation to make more money? Or will it really benefit people?” [3].

At first glance, I accepted this statement at face value. Upon further reflection, I soon realized this statement is a false dichotomy. This got me to thinking about false dichotomies related to computing and society with the hope that I could use this parting opinion to shed further light on these false dichotomies.

Before we dive in, it’s worth mentioning that while I cannot recall previously seeing the following concepts presented as false dichotomies, I acknowledge the numerous researchers who have studied the issues they address, despite citing only a few representative examples from the literature. Also, I have never met the author of the previous quote, and accept his commitment to advancing the mission of our SIG by raising the question.

False Dichotomy 101

A dichotomy is “a division involving apparently incompatible or opposite principles” and a false dichotomy is a “situation in which two alternative points of view are presented as the only options, whereas others are available” [11].

Although there are varying degrees of anecdotal and scientific evidence for the false dichotomies presented here, my experience suggests they are believed by more members of society than I would like to accept. If you disagree with my assumption, I propose we could validate it using an Implicit Association Test similar to those used to reveal hidden biases [1].

Money vs Contributing

At this point, let’s make it official by stating the previous false dichotomy more properly

**CSFD-1**

You can make serious money in computing or
You can contribute to Society

As you see, I’ve also given the computing community this false dichotomy’s “true name”, the acronym CSFD-1, Computers and Society False Dichotomy One¹. Hence, not only have we gained the advantage of being able to refer to it when needed, we know have power to control it. Keep in mind, CSFD-1 is not more important than the other false dichotomies presented in the remainder of this opinion; it is simply the first one that annoyed me enough to write about.

I spent some serious money/time in self-deliberation considering whether any adjective was required to qualify money in CS-FD-1, and if so, which one. After all, with the exception of charitable contributions to society, every computing professional is being paid as part of their employment, even when working for a non-profit organization.

With average yearly incomes ranging from $530 to $186,080 (U.S.) per country [12], it's safe to assume that computing professionals are earning a few deviations above these means without doing the math. For example, the median income in the United States is $65,850, which ranks eight in the world. As a lower limit, consider working as a programmer for a non-profit where a median income of $48,172 has been reported [6]. Despite this lower than average national salary, at the time of this writing, there are advertised non-profit programming positions ranging between $40k and $108k [13]. I leave it up to the reader to judge whether this is serious money. I’ve selected non-profits as a “worst-case” lower income limit since it appears safe to assume that non-profits are intentionally focused on contributing to society.

**You can earn serious money in computing or contribute to society.**

As I imagine most computing professionals believe they are contributing to society, which is a topic I’ll examine in a future column, the “best case” can be seen in a quick scan of the richest people in the world, which suggests a focus on computing can result in serious money [4].

Instead, of focusing on the best and worst case extremes, let’s consider an “average case. As a representative average case, I’ll select a software developer working for a healthcare focused company who is tasked with writing software, for example, for medical imaging systems, healthcare records, etc. The advertised salaries of these positions are comparable to those found in other software development positions, which are well above the national median income in the U.S. Naturally, my assumption in selecting such software development positions is that working on healthcare solutions contributes positively to society.

You can strive to improve the human condition by studying humanities or study computer science.

**Humanities vs Computer Science**

As my second false dichotomy with respect to computing and society, I offer up the perception,

**CS-FD-2**

You can strive to improve the human condition by studying humanities or
You can study computer science.

Four over forty years, evidence based on student interest in social advocacy has been a negative predictor of pursuit of a degree in computer science [9]. I content that such students represent a reasonably sized portion of society. My experience as the Chair of a computer science department in a Jesuit university also lends personal credence to this dichotomy. My university’s mission focus on “men and women in service of others” [8] results in us receiving applications from many perspective students who have a desire to contribute to the common good. The specific major and career direction of these students ranges from undecided to absolutely sure of their desire to major in computer science, another STEM degree, or a humanities major. During interactions with these students and their parents, the conversation often turns to the relation of computing, and other fields, to society. Inevitably, I am often the only one in the group who initially believes computing professionals are contributing to society in the way that humanities or other professions do. I’ve found it easy to convince everyone that computing contributes; not so easy to convince a student to pursue a computer science degree instead of pre-law, pre-med, psychology, etc. Their mind is already made

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1The later interpretation is personally convenient, when I have to address prospective computer science students, their parents, and my liberal arts colleagues.
You can be good writing or good at math & programming

Science & Math vs English & History
As a final false dichotomy, I offer
CSFD-5
You can be good at writing or
You can be good at Math & Programming
Although my parting opinion columns in Computers and Society might demonstrate otherwise, there are plethora of individuals who excel at both. I debated using "soft skills" instead of writing, or in fact, any other area associated with the humanities. As an educator, I know there are a multitude of factors that contribute to student success including motivation. With this in mind, my experience suggest there are more high school students than you imagine who have excelled in every educational discipline they tried. Furthermore, I'd be willing to wager that many existing humanities students would also excel within computing careers.

Conclusion
The astute, and regular reader of Computers and Society might have noticed that this is the first parting opinion column I've written that doesn’t specifically focus in some way on the danger that computing poses to society. Perhaps, it’s more focused on the danger that society poses to computing. My colleagues and I have argued elsewhere for future computing professionals who deeply understand that they can use their unique skills to tackle the major social issues of our time [5] (though the opinions in this column are my own). I believe the false dichotomies raised in this piece contribute to a reduced number of computing practitioners, who might otherwise contribute to computing fostering the social common good.

As I observed at the beginning of this piece, there is a growing body of literature focused on barriers and perception, which unfortunately are too often true, to achieving a more diverse community of computing practitioners. The computing and society false dichotomies previously introduce follow naturally from these body of literature. It is my hope that by introducing them as false dichotomies, the computing community can make better progress at dispelling them. This includes addressing the myriad of reasons why they arose in the first place. I am not suggesting there is no work to be done. In fact, we should accelerate our efforts to understand and remove such barriers.

The choice is ours; how should we proceed?

References

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Real People vs Stereotypes
At the 2007 Grace Harper Conference celebrating women in computing, I first heard that Hollywood isn’t helping the computing community since they routinely portray computing professionals in unrealistic ways². This leads to.
CSFD-4
You are a normal member of society or
You are a computer scientist, perhaps a genius, but certainly an awkward geek.
A nice summary of the Hollywood influenced and other stereotypes associated with computer scientists can be found in [10] and its references. Along these lines, my wife certainly refers to me as a geek with respect to social situations, I certainly don’t see it that way. More importantly, in thirty years of working with computing professionals, I can count on one hand those that truly match the Hollywood stereotype. Certainly not a proof, but I wonder how many of my esteemed readers are truly socially awkward?
²Unfortunately, I don’t remember who claimed this.